This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

DISCOURSE

ON THE

STUDIES OF THE UNIVERSITY OF CAMBRIDGE.

BY

ADAM SEDGWICK, M.A., F.R.S.,

WOODWARDIAN PROFESSOR,
AND FELLOW OF TRINITY COLLEGE.

THE FIFTH EDITION, WITH ADDITIONS,
AND
A PRELIMINARY DISSERTATION.

LIBRARY
NEW-YORK

LONDON:
JOHN W. PARKER.
CAMBRIDGE: JOHN DEIGHTON.

M.DCCC.L.

Cambridge:
Printed at the University Press.

58

TO

THE MASTER,

FELLOWS AND STUDENTS

OF

TRINITY COLLEGE, CAMBRIDGE,

AND

ESPECIALLY TO THOSE AT WHOSE REQUEST

IT IS PUBLISHED,

THE FOLLOWING DISCOURSE

IS DEDICATED

BY THEIR AFFECTIONATE AND FAITHFUL SERVANT,

THE AUTHOR.

CONTENTS.

PREFACE TO THE FIRST EDITION.

PREFACE TO THE FIFTH EDITION,

PRELIMINARY DISSERTATION.

SECT. PAGE

1 Introductory Remarks on the Doctrine of Final Causes . ix

2 Theory of Spontaneous Generation, Transmutation of Species, &c. xvii

3 Fœtal Transformations, and their bearing on the Theory of Development xxvii

4 Organic Phenomena of Geology, and general remarks on their bearing on the Theory of Development . . . xliv

5 Animal and vegetable Remains of the Primary or Palæozoic Division lviii

First Forms of Vegetable and Animal Life as described in *The Vestiges*, &c. lxxviii

6 Fossils of the Secondary Division, &c. lxxxix

7 Organic Remains of the Tertiary Division, &c. . . . cvii

8 Materialism. Mechanical and Moral Laws. Laws of Chance. Tendencies of Modern Science. Fantastical views of Nature. Evils of rash Generalization. Education, &c. cxl

9 Conditions of the Mind that have led men to deny a Personal Creator. Atheism and Pantheism. Illustrations of the doctrine of Final Causes. Galvanic and Phrenological Hypotheses, Mechanical Inventions, &c. clxxiii

10 On the Ideal Theory of Locke—imperfections of his Analysis. Schools of the Idealist and the Sensualists. Mischief of setting up Idealism as the interpreter of material nature, illustrated by the works of Oken, &c. cxcii

SECT. PAGE

11 Digression on some Discoveries of Oken followed out by Owen. Archetype of Nature. General Scale of Nature. Never existed at one time in the History of the Earth. The reconstruction of the Scale subversive of the Theory of Development, &c. ccvi

12 Reconsideration of the Argument for Final Causes. Miracles. Belief in a First Cause, and Moral Conclusions from it. Induction the Fountain of all Material Truth, &c. ccxxix

PART II.

1 Pantheistic views of Revelation and its Evidences, and Comments on the Newtonian Philosophy. Evidences of Christianity, Historical and Prophetical. Moral Purity of the Gospel. Its Propagation and effects on the Progress of Man, &c. cclvi

Arguments from Analogy ccciv

2 Recent Changes in the University Course. Modern Science of Cambridge—Philosophical Society. Modern external improvements. Moral and social character of the Students, &c. cccxxiii

External Improvements in Cambridge cccxliii

3 Modern religious movements. Principles of the Church of England contrasted with those of the Church of Rome. *Tracts for the Times.* Terms of Communion. Immorality of the *Tracts.* Acts of Apostasy. Causes of error in our estimate of religious and moral questions. True Catholicity. Conclusion cccclxvi

DISCOURSE,

(pp. 1—94).

APPENDIX TO THE DISCOURSE.

NOTE PAGE

A Examples of the Method of Induction 95

B General Diffusion of the Imponderable Agents through Space . 102

C Reply to Fanatical Objections against the Study of Physical Science 104

D On the Nebular Hypothesis 118

E Religious Bearing of the Study of Nature—La Place's Sentiments on Education—Natural and Revealed Religion—Fanatical Objections to some passages in the Discourse . . . 127

F Natural Theology—Paley—Examples of Adaptation in Comparative Anatomy, derived from the Teeth and Jaws of Mammals 143

G Heathen Views of Final Causes. Reasons which have led Men to reject the Truth of Natural Theology 150

H Objections to some passages in Paley's Moral Philosophy . 160

SUPPLEMENT TO THE APPENDIX.

No.

I. Additional Remarks on the Nebular Hypothesis . . . 176

II. Animal Creations by Galvanism 183

III. On the Placoïd and Ganoïd Fishes in the Palæosoic Strata, and their places in the Organic Scale 185

IV. On the supposed Interchange of Vegetable Species—Hybridization—Alternate Generations of Steenstrup—Parthenogenesis of Owen, &c. 193

V. On the Development of the Animal and Vegetable Kingdoms in the oldest known Fossiliferous Strata 207

VI. On the supposed derivation of the Terrestrial Flora from the Marine, by a Natural Transmutation of Species . . . 212

VII. On the Use and Abuse of the word Law; and on the methods by which we rise to a right conception of it among physical Phenomena — Kepler's Laws—Bode's Law — Kirkwood's Law, &c. . . . . *ib.*

VIII. A Series of Extracts from Oken's *Physiophilosophy* . . 222

IX. Remarks on the Theory of *The Vestiges*, and on the Author's *Explanations* — Moral and Religious considerations opposed to Materialism 247

X. Transactions of the Cambridge Philosophical Society — *The Prelude* of W. Wordsworth, &c. 314

ERRATA.

Preface, p. xviii. l. 21, *for* in which *read* from which
xxxvii. l. 20, *for* a back-bone *read* a back-bone and spinal chord
lxiv. l. 12, *for* a Cestracion *read* a Cestraciont
lxxxii. second Note, *for* p. 64 *read* p. 65.
xcii. l. 28, *for* Brachiopoda *read* Cephalopoda
clx. Add the following foot-note,
See Supplement to the Appendix, No. IX.
ccxv. l. 7, *for* the Radiata *read* those Radiata
cccxii. l. 8, *for* evidences our *read* evidences of our
ccclxvi. l. 15, *for* Churchman Low *read* Churchman and Low
ccccx. l. 22, *for* self-love breed *read* self-love and breed
ccccxv. l. 6 from the bottom, *for* It *read* it
Ib. last line, *for* (we dare to say logically) *read* (we dare to say) logically
Appendix, p. 122, l. 9, *for* round our own *read* round their own
Supplement to Appendix, p. 178, l. 16, *for* infra p. 27 *read* supra p. 27.

PREFACE

TO THE FIRST EDITION.

The substance of the following Discourse was delivered in the Chapel of Trinity College, on the day of the Annual Commemoration in December last, and is published at the request of the junior Members of the Society, to whom it was more immediately addressed. As the long delay in its publication requires some apology, the Author begs leave to state, that the request, on which he is now acting, first reached him during the Christmas vacation, when he was absent from the University; and that for some weeks after his return he was so much occupied in completing a course of lectures and in passing two memoirs through the press, that the Lent Term had nearly expired before he had time to revise his MS. for the printer. Without any further delay it was then struck off as far as page 33; and he hoped to have published it at the commencement of the Easter Term.

During its progress through the press he found however that he had undertaken a more difficult task than he had imagined: for having animadverted with much freedom on some parts of the

Cambridge course of reading, he felt himself compelled, before he dared to give what he had written to the public, to enter at more length on a justification of his opinions. On this account, his remarks on the classical, metaphysical, and moral studies of the University (extending from p. 33 to p. 91) were cast over again, and expanded to at least three times their original length.

Before this part of his task was completed, an attack of indisposition compelled him for a short time to quit the University; and on his return the languor of ill health, and a series of engagements of which it is not necessary here to speak, prevented him from immediately resuming it: so that the latter part of this Discourse was not printed till a late period in the Easter Term, when most of the junior Members had left the University for the long vacation. On this account he resolved not to publish before the University reassembled in the October Term.

Lest he should be accused of printing a discourse too widely differing from the one he was requested to publish, he wishes to state, that (with the exception of mere verbal corrections) it is, as far as p. 33, in the form in which it was first written, and that the conclusion has undergone no change: and in the two parts which have been so much expanded, he has preserved the scope and sentiments, and in many instances the very words, of his first sketch. The notes added in an Appendix are not written to serve any purpose of ostentation. By most academic persons they may be considered unnecessary: but should a single reader find them of use in explaining or enforcing what is stated in the text, the Author will not regret that he has written them.

He has attacked the utilitarian theory of morals, not merely because he thinks it founded on false reasoning, but because he also believes that it produces a degrading effect on the temper and conduct of those who adopt it. It is, however, more easy to pull down than to build up; and he thinks it unfortunate that there is no English work on morals at once unexceptionable in its principles, and cast in such a form as to meet the wants of the University. Bishop Butler's three Sermons on Human Nature and his Dissertation on the Nature of Virtue have lately become subjects of examination in Trinity College. Of their kind, they are works of inestimable value: but they are devoted rather to the discussion of the principles of morality than to the establishment of a system of moral philosophy; and they are considered by most persons, who begin to speculate on such questions, both difficult and uninviting.

Before concluding this Preface, the Author disclaims any notion of holding out the following pages as a formal dissertation on academic studies. Such an attempt would be far above his powers; not falling in with his usual habits of thought, and requiring research for which he has neither time nor inclination. What is here printed treats of subjects treated of a hundred times before, and professes no originality, except what it derives from the circumstances under which it was delivered and the persons to whom it was addressed. Should it be the means of leading even a small number of them to think more justly on any of the subjects of academic learning, and to combine moral and religious habits of thought with those severe physical studies, during which the best faculties of the mind are sometimes permitted to droop and wither, his most earnest wishes will be accomplished.

TRINITY COLLEGE, CAMBRIDGE,
Nov. 5, 1833.

PREFACE

TO

THE FIFTH EDITION.

§ 1. *Introductory Remarks on the Doctrine of Final Causes.*

THIS Edition, with the exception of a few verbal corrections too insignificant to require any formal notice, is a reprint from the text of a Discourse—first published in 1833. Several additions have, however, been made to the Notes of the Appendix, and their arrangement has been changed. Note (D) on the Nebular Hypothesis*, and note (E) in reply to some objections which had been taken to the religious principles of the Discourse, are entirely new. In note (G) I have added a translation of the Greek extract from Xenophon's *Memorabilia:* and about two pages have been added to note (H) (note (E) of the former editions), on Paley's *Principles of Moral and Political Philosophy.* I do not wish to change one sentence of what I had written on the Utilitarian Theory of Morals; because my opinions on that subject are unchanged, and I think it not expedient to write upon it at greater length.

As the Discourse and the Notes of the Appendix were written at different times, after long interruptions, and to meet specific objections, I have been led into several repetitions which might be avoided in a more formal treatise: but the very repetitions are not perhaps without their use. During the passage of this edition through the press, I intended, in a concluding note, to discuss some points just touched on in the body of this little work; and, especially, to notice at considerable length the development of organic forms in the successive strata of the earth. I, however, soon discovered that the subject was far too large for a single note: and had there been no other reason for leaving this part of my task incomplete, the interruptions of ill health would have prevented me from giving more than the bare outline of an argument which I hope to fill up at some future time. The outline, such as it is, I have thought it best to subjoin in this Preface; requesting the reader to consider it not so much an attempt at a full and formal argument, as a series of suggestions, which may be, perhaps, hereafter more expanded and better enforced.

---

* See the Supplement to the Appendix No. 1.

(1) The kingdoms of nature are presented to our senses in a succession of material actions, so adapted to one another as to end in harmony and order. All these changes and movements among the things around us seem to be produced by powers of nature we call second causes: but the mind of man cannot and will not rest content with second causes, and is constrained to look above them to some First Cause. Among the things produced by the hands of man we are able to separate works of accident from works of design: we gain this knowledge by experience, and by reflecting on

what passes within ourselves: and it is by taking this knowledge with us in our judgments on the works of God, that we are naturally led to a conception of an intelligent First Cause, capable of producing all the phenomena of the visible world.

On the other hand, it is said by Geoffroy Saint-Hilaire, and other materialists of the same school, "We ascribe no intention to God, for we do not trust the feeble powers of reason"..."we observe facts, and pretend only to the character of historians"..."we cannot make an intelligent being of nature," &c. &c. There is a latent sophism in all such statements as these; and were the authors of them true to their own principles, they ought to stop short among individual phenomena, and never ascend to the conception of any general law of nature.

While they deny the indications of a God, they deify dead matter, by deriving from it works that have all the external characters of things produced by design and high intelligence. We are constrained, by the very law of our common being, to ascend to the conception of some power ordaining and directing the natural movements and changes we see around us. Among these changes we see the most obvious marks of intelligence. How are these indications to be accounted for? We cannot deify dead matter, and make of it an intelligent cause. We are, therefore, constrained to speak of an intelligent power superior to nature; because we cannot, without the assumed existence of such a power, so comprehend the works of nature as to bring them into co-ordination with the knowledge we have of ourselves, and our experience of the things around us.

(2) The doctrine of Final Causes, drawn from the structure of the organic world, has perhaps been stated at sufficient length in the following Discourse, and the Notes of the Appendix. It cannot be better stated than in the homely and graphic argument of Socrates (*infra* p. 151): The eye is made to see, the ear is made to hear, and the organs of every living being, so far as we can comprehend them, have a design and purpose. Under this point of view "these various organs seem altogether the contrivance of some wise artificer who loves the beings he has created," (*infra* p. 152). Organic structures give us, therefore, a clear proof of the doctrine of Final Causes; and these causes have not, according to one of the quaint conceits of Bacon, been unfruitful, like virgins dedicated to God; but in the hands of Cuvier, Owen, and many other great physiologists, have not only rationalized a multitude of known truths, but have also been continually pregnant with new discoveries.

The same school of materialists, to whom I have already pointed, object to our language as well as to our principles. It is true that in all cases we are compelled to express our meaning in words which are but the reflexion of our own nature. We know what we mean by our own muscular force, and we apply the same word *force*, it may be figuratively, to the powers of nature producing mechanical movement. So also we comprehend the meaning of cause and effect, will and design, as applied to the works of our own hands: and in like manner we analogically apply these words to organic structures and anatomical designs proceeding from the workmanship of God. But should we gain by any change of the language whereby we describe the phenomena of the organic world as reflected in the mind of man? While speaking of organic bodies shall we only tell, like the modern materialist school, "of the principle of connexion"—"the elective affinities of organic elements"—"the equilibration of organs,"—&c., and think that our words are one jot less figurative and more true to nature? On the contrary, I think them more figurative and incomparably less true to nature than the language in more common use among the naturalists and physiologists of this country. The language just quoted is used for the express purpose of keeping out of sight an intelligent First Cause; while those who have invented it are constrained to deify the dead elements; forgetting all the while that they have on every side of them, and within themselves, the phenomena of mind as well as of matter; and that every material structure or material change produced by man, and bearing any similitude to the mechanical organic structures subservient to life, is the result of design and will. So intimately are the proofs of design and purpose woven into the frame-work of organic life, that, spite of themselves, the modern materialists often find it impossible (as they themselves allow) to describe the phenomena before them, without falling into language implying the reality of those very final causes which they have in theory denied. And let not this fact be ascribed to an imperfection in the words of daily use; but rather let it be appealed to as a proof of nature's teaching, and a true reflexion of her image by the mind of man, before that mind has been warped by any theory.

(3) Of organized beings we know the beginning and the end, and we know the leading purposes to which their organs are subservient. Hence in speculating about the functions of organic structures, we may often use the doctrine of Final Cause as the foundation of our reasoning and the source of true induction. This we cannot do in questions that are purely physical: for while we contemplate any great physical law we neither know its beginning nor its end; neither do we comprehend its whole purpose. Thus, while analyzing the properties of light by direct experiment, we should only desert the true road to discovery were we to turn aside to consider the adaptation of light to our wants; or the anatomy of the eye, and its fitness to convey the impressions of light to the visual sense. Bacon saw this distinction clearly, and wrote well upon the misapplication of final causes. Could he have prophetically anticipated the modern discoveries in physiology, perhaps his censures would have been somewhat qualified, or applied with more caution: but philosophers of every sound school will be ready to subscribe to the great truths conveyed in the following sentences (*Advancement of Learning*, Book II.): "The handling of final causes, mixed with the rest in physical inquiries, hath intercepted the severe and diligent inquiry of all real and physical

causes, and given men the occasion to stay upon these satisfactory and specious causes, to the great arrest and prejudice of further discovery. For this I find done not only by Plato, who ever anchoreth on that shore, but by Aristotle, Galen, and others, which do usually likewise fall upon these flats of discoursing causes.".... "They are indeed but remoras and hinderances to stay and slug the ship from further sailing; and have brought this to pass, that the search of the physical causes hath been neglected, and passed in silence."...... "Not because these final causes are not true, and worthy to be inquired, being kept within their own province; but because their excursions into the limits of physical causes hath bred a vastness and solitude in that track. For otherwise, keeping their precincts and borders, men are extremely deceived if they think there is an enmity or repugnancy at all between them;"...... "both causes being true and compatible; the one declaring an intention, the other a consequence only."

(4) While considering the orderly movements of nature, we speak of second causes, and our language defines correctly the manner in which the phenomena of nature are reflected in the human mind. But how did these phenomena begin, and by what power were they first set in movement? These questions inevitably lead us to a conception of a creative power of nature, quite distinct from the vulgar operations carried on before our eyes: and thus are we led to speak of the *creative power*, as well as of the *sustaining power* of God. These ideas are distinct; and to confound them under

one general expression would only be a denial of our nature, and an utter confusion of thought, in our use of general terms. One expression tells us of the beginning of natural phenomena, the other defines their continuance in subordination to law.

It may be true that we can form no adequate conception of creative power; neither, on the other hand, have we any adequate conception of the sustaining power, whereby the order of the natural world is upheld. It may also be true that in the mind and will of the intelligent First Cause there is no distinction between the exercise of a creative and a sustaining power. Of this we know absolutely nothing; and what do we gain by such a speculation? It is irreverent, and out of the reach of sound philosophy: for we cannot, to use the words of Bacon, "fly up to the secrets of the Deity by the waxen wings of the senses." When applied to nature all our language is inadequate, and but feebly shadows out such ultimate truths of the material world as would express the will and purpose of the great First Cause. But our knowledge is not unreal because it is limited; provided it be only the expression of that form of truth which defines the reflexion of the natural world in the mind of man, while he is honestly employed upon the materials surrounding him, and neither forgets his own faculties, nor oversteps the evidence that is before him.

To meet such views as these, it has been affirmed, that we behold in nature only a chain of second causes of which we know neither the beginning nor the end;

that we have no right to speak of a Creator or of a creative power; because the links of nature's chain may be infinite in number, and the order of nature may have been eternal. With such a view of nature we may end in downright atheism; or, if we accept the indications of intelligence in the natural world, we may perhaps advance one step farther, and try to satisfy the longings of the mind in some cold scheme of pantheism. As a matter of fact, views, like those just pointed at, have been brought forward again and again by men who have denied the being of a God; or, if they could not bring themselves so far to belie their inner nature as to deny the being of a God, were at least resolved to deprive him of his personality, of his creative power and will, and of his providential government. To combat such opinions is not the immediate purpose of this Preface; for I wish to deal with facts rather than opinions. Whatever semblance of truth they may have, while we arrest ourselves among the laws of dead matter, they are utterly without meaning when applied to the forms of organic life: for it is now beyond dispute, and is proved by the physical records of the earth, *that all the visible forms of organic life had a beginning in time.* To have established this point is the glory of Geology.

§ 2. *Theory of Spontaneous Generation, Transmutation of Species, &c.*

To combat or explain away the previous conclusion a new scheme of nature was invented. It was contended that we know nothing but second causes, and that they are all in all—that the commencement of organic life was nothing more than one of the material changes in the endless cycle of movements going on continually before our eyes—a new material conbination produced by the elemental powers of the natural world; and as purely natural as any new mechanical deposit or any new chemical combination. This view of the commencement of the organic world was called *spontaneous generation.*

But our theorists were not content to rest at this point. They further assumed that the humblest forms of organic life, having thus begun, had also a natural tendency to breed upwards, so as to ascend (by a law of progressive development) on a natural scale of organic forms:—that a monad thus passed by natural means (and by natural means only) into the more complicated form of some zoophyte—the zoophyte into a mollusk—the mollusk, by a like succession of natural steps, into a fish, a reptile, a bird, and a mammal:—and lastly, that by a like natural progression (in which all idea of creative power is excluded) some inferior mammal passed into a monkey, and a monkey into a man. The successive changes, implied in this theory, were not sudden, but slow and gradual, and brought about, during the lapse of ages, by the insensible sliding of one species into another. Thus by the simple operation of second causes we obtain, on the principles of this theory, two classes of phenomena, one defined by the words *spontaneous generation*, the other by such terms as *progressive* *development*, or *transmutation of species*: and thus we are supposed naturally to account for all the phenomena of organic life and the whole sequence of animated nature.

The authors and early defenders of this theory were, perhaps without exception, unbelievers in every form of Revealed Truth. They were materialists in the rankest sense of that term. They denied all distinction between material and moral phenomena—regarding them both as nothing more than the varied manifestations of the powers of second causes. Most of them formally denied all proofs of design in nature, and all indications of an overruling Providence; and thus struck at the foundation of Natural Religion. But a doctrine may be true, and yet may be turned to evil purposes. The first questions for discussion are the following—Is this doctrine true? Has the animal kingdom been first produced by *spontaneous generation*, and afterwards perfected by *transmutation and progressive development?*

The Author of the *Vestiges of the Natural History of Creation*, has adopted the whole scheme which has been sketched in the preceding sentences; and to a comment on his principles I must devote a portion of this Preface. His work is written in a dogmatic spirit, and in good language. It is written also in the words of seeming reverence, and takes for granted the indications of a Final Cause; though its principles and language were invented and affirmed by those who did their best to cheat us out of our conceptions of a Creator, and denied the whole doctrine of Final Causes. The Author proved, by the numerous mistakes of his early editions, that he was neither well acquainted with the first principles of physics, nor well read in any sound work on physiology. Hence, his book was received with no respect and favour by men of science. On this point I can, even now, speak with the utmost confidence. But it was new in the popular literature of this country; and more than this, it was systematical and positive, and seemed to offer to the smatterers in natural science a kind of short and royal road to universal knowledge. By such persons it has been received with no common favour.

The Author is not only unacquainted with any of the severe lessons of inductive knowledge, but has a mind apparently incapable of comprehending them. Without this supposition it would be hardly possible to acquit him of insincerity. No moral accusation is, however, brought against him. He writes in good faith, and had imposed upon himself before he unconsciously attempted to deceive others. The misinterpreted facts, to which he first clung to support his argument, may be rescued from his grasp, one after another. But he will not easily change or modify his first opinions: for, speaking of specific transmutations, he has told us—that though there never may have been an instance of it since the beginning of the human race, "yet the doctrine may be shewn, on grounds altogether apart, to have a strong probability on its side."..."And though this knowledge were never to be clearly attained, it would not much affect the present argument, provided it be satisfactorily shewn that there must be some such power within the natural range of things." Satisfactorily shewn that there must be some power in nature independent of our experience! The Author while using this language is speaking of second causes; and seems never to have learnt that there are not, and never can be, any probabilities in nature that are not suggested by experience. I now pass on to his system.

(1) He assumes the truth of the Nebular Hypothesis. It is his first link in the chain of natural causes. But has this hypothesis been confirmed by the progress of discovery? Is it passing into the condition of a sound physical theory? I think the contrary. On this subject I request the academic reader (for to such readers the following little work is still addressed) to turn to note (D) of the Appendix (*infra*, p. 118[*].) I cannot pause to notice the author's violation of every rule of sober and severe induction in his extravagant extension of the hypothesis.

(2) After a series of natural transformations, he at length finds a world fit for the support of animal life, and animal life begins. Spontaneous generation and a gradual transformation of species on an ascending scale are now to bring about all the phenomena of the organic world[†]. He allows of no creative will distinct

---

[*] See also Supplement to the Appendix No. I.

[†] In using these words I refer to no particular scheme of arrangement for the organic kingdoms. The reasoning of the text applies to every scheme, linear or circular, simple or complicated. Every scheme, however, implies an ascent from beings of a low organic structure to beings of a higher; and it is a matter of indifference to the argument, whether this ascent take place upon one line or upon a thousand.

from the vulgar action of second causes—no distinction between mind and matter—material and moral:—and man (with all his powers, physical and intellectual, his responsibilities as a social being, his expectations of moral progress, and his hopes of future good) is, so far as regards causation, a phenomenon of the same order with the incrustation on a culinary vessel, the salt formed in a chemist's laboratory, or the crystal in a mineral vein. Should we gain in clearness of conception, or be more philosophical in our use of general terms, by linking together (as the supposed products of a common material causation) phenomena so different in kind, and so widely asunder in every manifestation they make to the mind of man? Is there any sobriety or truth in such a scheme as this? On the contrary, I think it shallow, mischievous, and untrue.

(3) All natural knowledge is based on inductive reasoning. We have learnt to comprehend the mechanical movement of the heavens by first learning the laws of motion upon the earth. In like manner, we have learnt to speculate securely on the functions of organized being, during the old conditions of the earth, by first studying the laws of organic life among the phenomena of living nature. In every instance we must begin with what is known and present to us, before we can speculate about what is unknown and remote. To this rule we know of no exception.

(4) What proof, then, have we of the doctrine of spontaneous generation in the living world? In replying that we are utterly without proof, I only state

my firm conviction. All the Author's instances are drawn from the dark corners of nature's kingdom, where it is almost physically impossible to trace the progress of her workmanship. Sober philosophy would tell him, in such cases, to be guided by analogy; and all analogy is against him. We may presume that he has selected such instances as are best suited to fortify his argument. And what are they?—The *Hydatid*, which sometimes affects the domestic pig, and is supposed not to attack the wild animal; the *Larva* of the *Œnopota cellaris*, which lives nowhere but in wine and beer; an *insect* which feeds only on chocolate; a *Tinea*, which only attacks dressed wool; and the *Pimelodes cyclopum*, which are only found in subterranean lakes in the old craters of the Andes. How are the negations implied in the three first instances to be proved? How, for example, is it possible to prove that no wild boar is ever attacked by the *Hydatid?* The domestic animals are constantly before us, the wild animals are not. The *Tinea* attacks the fleece, as well as the prepared and manufactured wool. And were the Author's statement true to the letter it would start no new difficulty; for sheep in the wild state must cast their wool, which, when scoured by the elements, might become a proper nidus for the *Tinea*. The case of the *Pimelodes cyclopum* is only one example, out of many, of animals with a confined habitat: neither is it fairly stated; for those who have described these fishes tell us that they are found in the streams on the mountain-sides as well as in the old craters of the Andes. They are not more difficult to account for than the trout and other fishes so commonly found in the high mountain-lakes of Europe.

The *Entozoa* are, beyond comparison, the cases most difficult to account for: but the whole history of many species has been well explained in conformity with the common laws of generation: and, speaking generally, we may ask, if these creatures spring spontaneously without ova, how comes it to pass that nature has provided a means for the continuance of their species, and that some of them are almost incredibly prolific*?

But it was affirmed, within the last few years, that a *new animal* had been produced by a direct galvanic experiment, and without any pre-existing germs of animal life. If so, we should have one instance of the commencement of organic life, in conformity with the hypothesis of spontaneous generation. It turned out, however, that this new marvel of nature's chemistry was but an old and wellknown species of *Acarus*, of which the *ova*, in tens of thousands, probably existed in the dusty corners of the very room where the first experiments were carried on. The creatures thus produced were not (as they ought to have been) low in the organic scale, but were of a very complicated structure; and one of the pretended creations was a female well filled with eggs. If galvanism could thus create animals, no wonder it should also exercise over them a fecundating influence! But is there so much as one good physiologist or chemist who now adopts the first interpretation of these galvanic experiments? I believe not so much as one. Ridicule is the only weapon we can condescend to use against the outrage on common sense and universal experience implied in this mockery of a creative power. One thing, however, is proved by this history, that to be an intrepid vindicator of rash hypotheses a man must be first endowed by nature with an ample capacity of belief*.

---

* See Professor Owen's Lectures on the Invertebrate Animals (1843, pp. 76—81), and the *Edinburgh Review* (July, 1845, pp. 68—72). The ova in one individual of the Entozoa amount to sixty-four millions!

(5) Have we any proof of *specific transmutations* in the living world? We have not, so far as I understand the question, so much as the shadow of any proof of them. The constancy of organic forms—like species producing like according to a fixed law of generation—is the obvious and certain fact. These laws are to the organic world what the laws of elective affinity are to chemical combinations. Varieties there are—the limits of species are not well known—the riches of nature are so great that, in the almost boundless varieties of animal forms created on a common plan, one species often comes close upon another. As an inevitable consequence, naturalists have made many blunders; and their vanity may sometimes have led them to give new specific names, where the new names were not called for. But the mistakes of naturalists alter not the laws of nature. Art has been pushed to the utmost in modifying the natural forms of organic life: but not so much as one true specific change has been ever brought about, so as to raise the progeny of any known animal to a

---

* See Supplement to the Appendix No. II.

higher grade on the organic scale. These are the broad conclusions we arrive at from all the facts and analogies offered to our senses. In this instance it will not serve our purpose to entrench ourselves among the dark corners of the animal kingdom; where, (as in the case of the *Entozoa*,) from the inevitable want of evidence, we may, by casting away analogy, affirm that generation is ambiguous, and that species are inconstant. The Author's theory demands specific transmutations on the whole ascending scale, from a monad to a man. To suppose that specific transmutations are now going on at the bottom of the scale, where our senses fail us, and we can have no good evidence of the fact; while no transmutations are going on in the upper steps of the organic scale, where we have good evidence, is to stultify the whole argument, and to suppose an inconstancy in nature's workmanship, abhorrent from any conception we can form of a true organic law.

A good theory embodies in verbal propositions our conceptions of natural laws; and these conceptions are all based on observation, experiment, or good analogy. Does the hypothesis of *spontaneous generation* and *transmutation of species* deserve the name of a theory? It is not suggested, but contradicted, by the broad and obvious facts of nature; and I know of no good analogy to help it out. A hypothetical spirit may do good service, provided it urge us on to make new experiments; but if we rest content with it, and, above all, if it lead us, as it has too often done, to shut our eyes against facts, and to take from nature no response but such as suits our fanatical belief of what nature ought to be, it must do deadly mischief to the cause of inductive truth.

§ 3. *Fœtal Transformations and their bearing on the Theory of Development.*

Are there any other facts in living nature bearing on the hypothesis of development as stated by the Author of the *Vestiges?* He dwells on the transformations exhibited by every vertebrate animal during its fœtal life—from its first existence as an animated germ, to its full maturity of organic structure. If it be true that all the higher animals (of course including man) have, during their early life, gone through a series of transformations whereby they have been made to pass through all the successive inferior Classes in the great ascending scale of nature; why should we not suppose that in the universal womb of the living world one species may be transformed into another on a similar ascending scale? Taking it at the very best, the assertion implied in such a question is based only on a vague analogy, which may help us to turn a figurative sentence, but can never serve a higher purpose, or take the place of fact as the support of a sound theory. The broad intelligible fact is this:—whatever transformations their progeny may go through while in the fœtal state, like species continue to produce their like. "By no artifices of human skill (and artifice has not been wanting) has the animated ovum of one species been developed into another; by no artifice has the ovum of any known species been permanently developed into any new species; by no continued operation of analogous conditions, however carefully conducted, have the ova of different species been developed into animals of one kind." (Dr. Clark.) Nature is true to her work, and will not turn aside to follow the crooked track of an hypothesis.

But is it true that the higher animals do undergo during their fœtal state a transformation from one organic class to another, on a regular ascending scale? Is it true, for instance, that the fœtus of a man, during the successive periods of gestation, is a monad, a polype, an insect, or a cephalopod? Is it afterwards a fish, a reptile, a bird, a beast, a monkey, and lastly a human being with a permanent organic form*? It is impossible to discuss such questions to much purpose within the limits of this Preface. All I pretend to do is to state a series of fundamental facts, out of which, when illustrated by anatomical designs and properly expanded, the true answers to these several questions may be drawn.

---

* This question is discussed, in a very condensed form, through twelve pages of the *Edinburgh Review*, (July, 1845), to which I may refer the reader. The Reviewer borrowed the best part of his argument from an excellent Memoir on Fœtal Development, read before the Cambridge Philosophical Society by Dr Clark, in the early part of 1845. I cannot withhold an earnest wish that he would publish this Memoir in a somewhat more expanded form, and with anatomical illustrations. Should any Reader wish to consult the Article in the *Edinburgh Review*, just referred to, I may inform him that it is very carelessly printed, and that its Author seems not to have well understood the mystery of correcting proof-sheets. The following *errata* will justify this remark.—*E. R.* No. 165, p. 10, l. 11, for Mackay read Macleay, and l. 18, for analyses read analogies: p. 21, l. 25, for positions read portions: p. 27, l. 15, and l. 32, for Bailey read Baily: p. 31, l. 16, for original read natural: p. 42, (line 2 from the bottom), for *radiata* read *articulata*—the word is correctly written, l. 19 of the same page: p. 56, l. 7, for *quané* read *quant;* and l. 8, for *crétes* read *créés:* p 59, l. 34, and l. 41, for *Bimana* read *Quadrumana ! !* Were not the words written correctly on other pages one might conclude that the Reviewer gave four hands to men, and only two to monkeys: p. 66, l. 11 from the bottom, for becomes read become: p. 68, l. 30, and l. 33, for *Hyatid* read *Hydatid:* p. 74, l. 24, for *spermatazoa* read *spermatozoa*.

First. There are certain phenomena which seem to imply a formal or specific character in the very beginnings of mammal life. I allude to the *spermatozoa*, first seen at the age of puberty; and if they differ specifically in different animals, then (whatever may be the office of these mysterious bodies—whether they act as mere stimulants, or in whatsoever way they act) there is an end of all approach to specific identity in the first beginnings of organic life.

Secondly. Let us suppose animal life to have begun. The first changes of the organic germ within the ovum of a mammal do resemble those observed in what has been called the "fissiparous generation" of the lowest grades of the animal kingdom. But these resemblances soon after cease; and the organic globules, by some mysterious bond of union unappreciable by microscopic sense, arrange themselves in two nearly parallel rows; and thus we have the first rudiments of a backbone, and a continuous spinal chord. But during the elaboration of this early organic structure, no anatomist has ever observed any succession of changes bringing the nascent embryo into a true anatomical similitude with the *Radiata*, *Articulata*, or *Mollusca*. Thus are three great Divisions, or Sub-kingdoms, including fifteen Classes in the organic scale (as given in the system of Cuvier) passed over without any corresponding fœtal type.

Assuredly this fact, were there no other, is fatal to a theory of regular progressive transformations; which starts from this position—that the organic germs of all animals are alike—and that man, and all the other higher animals, pass, while in the womb, through all the successive conditions that are permanent in the lower Classes of the great organic scale of nature.

Thirdly. There runs through all animated nature a grand unity of plan and purpose; were it not so, comparative anatomy could never have risen into a science. So much of similitude is found even among animals widely placed apart, that organs subservient to a common purpose may be brought into anatomical comparison, and often described under common names: and this is true not only of the perfect animal framework, but is true also of the successive organic changes during the fœtal state. But these resemblances produce no confusion of species, nor do they interfere with the clear distinctions between separate organic types.

There are two very distinct sets of changes, following in regular succession, during the fœtal state of all the higher animals. "In the first set are laid down the animal organs, the nervous system and organs of motion, as well as the intestinal canal and its appendages (sometimes called the *vegetative organs*), and a kind of intermediate system evolving gradually the heart and blood-vessels. The combination of all these is the true *embryo* state of the animal. The second set of changes produce the perfection of the animal, and determine its sex. These belong to what is called the *larva* state. Now the *embryo* state and the *larva* state are both passed *in ovo* by mammals and birds (and some vertebrates of another class); but the *larva* state is passed out of the *ovum* by batrachians, fishes, and most of the invertebrates*." During the progress of these changes, tufts and gills are gradually formed on the "branchial fissures" of batrachians and fishes; and when this structure is sufficiently advanced to enable these organs to discharge their offices, the growing animals are forced, by anatomical necessity, to quit the ovum, and begin an independent life. But during the corresponding period in the gestation of a mammal, no tufts or gills are found in the (so-called) "branchial fissures" of the *embyro*. No microscopic power has ever shewn the minutest germination of branchial tufts or gills. The extremities of the fœtus are ill-defined, and might in popular language be called fins or paddles: but they have not the anatomical structure of true fins; and the embryo breathes not, for a single instant, by help of gills. It is not, therefore, true, that the fœtus of a man, or any other mammal, ever passes through the animal conditions of a fish: and here again the theory of progressive fœtal development, from one corresponding germ through a succession of common types, breaks down, and is untrue to the workmanship of nature.

Fourthly. Do men, or any other of the higher animals, pass, during their fœtal growth, through the conditions of reptile life? The grand distinctions between the organic life of a reptile, and that of a bird or mammal, arise out of the modifications of the heart. This truth becomes obvious when we consider that the nutriment of the whole body, and the secretions of every organ, are drawn directly or indirectly from the blood. No reptile has the perfect double heart of a bird or mammal. What, then, are the organic transformations in the hearts of birds and mammals during their fœtal growth? To prevent mistake, I will again quote the Memoir of Dr. Clark: "The first rudiment of the heart appears in a single tube, and it gradually becomes bent like an Italian *S*; and it then makes three swellings which are afterwards, in mammals and birds, to become the two auricles, the two ventricles, and the aorta with the pulmonary artery. This led to the belief that the swelling for the auricles was first divided into two compartments by a septum; and that the swelling for the ventricles was divided at a later period of fœtal life. This belief is, however, contrary to fact. The septum is formed in the swelling corresponding to the ventricles a considerable time *before* it is formed in that corresponding to the auricles. So that, for a period, the heart of a human fœtus (as well as that of other mammals and birds) has one auricle and two ventricles. *Hence it does not pass through the form which is permanent in the Amphibia; but it does pass through a form not found permanent in any known creature.* This grand correction of an old mistake we owe to the concurrent labours of Valentin, Rathké, and Bischoff, who stand in the first rank of discoverers; and no good anatomist has pretended to contradict them. *The hearts of birds and mammals do not, therefore, pass through forms which are permanent in fishes and reptiles*[*]." Again, therefore, the theory of progressive fœtal development breaks down; and whatever semblance of reality it may have in the eyes of those who amuse themselves with tracing similitudes among the ill-defined and immature organs of fœtal life, the theory is anatomically untrue.

---

* Memoir, by Dr Clark.

Fifthly. As the fœtal forms of the higher animals approach maturity, and become gradually capable of breathing air, and supporting an independent existence, they are still bound up in anatomical conditions which are essential to their continued life, and fix an impassable barrier between one species and another. "At the period of fœtal life, when frogs and fishes are beginning to breathe by *branchial tufts* and *gills*, other amphibia and birds are breathing by *allantoïd;* and never, for an instant, breathe by *gills*. At the same period of fœtal development hot-blooded quadrupeds are breathing by *allantoïd* and *placenta* jointly; while man is breathing by *placenta* alone. These are essential fœtal differences connected with the last perfection of animal structure; and they form a wide anatomical separation, so as to bar all interchange or confusion of organic type." (Dr. Clark). To make these assertions clear would require a series of good anatomical drawings: but enough has been stated for my purpose. I have no wish either to extenuate or exaggerate the dealings of nature: but what has been stated crushes to atoms the theory of *The Vestiges*, so far it as has been drawn from the progressive forms of fœtal life.

---

[*] The above passage first appeared in the *Edinburgh Review*, July 1845, p. 80; and I am happy to quote it here on account of its great value, and also because it contained, I believe, the first allusion, made by an English writer, to a very remarkable discovery of the German anatomists. I need not, perhaps, inform the reader that, in the normal type, a fish's heart has one ventricle and one auricle, and that a reptile's heart has one ventricle and two auricles.

There is one grand fallacy which has warped all the descriptive writings of our Author's school. To serve the purpose of an hypothesis they have described the fœtus, in the successive stages of its growth, only by its central portions; and not by its whole mass, including its organic appendages. But it cannot be separated from these appendages without instant death, unless it have reached that maturity of structure which will enable it to maintain an independent life. Had they reference only to existing conditions of fœtal life, we might perhaps suppose, with a semblance of reason, that different Classes of the animal kingdom were not merely laid down upon the same general plan, but that they passed, by insensible gradations, into one another. As a matter of fact, however, to which there is no exception, these fœtal appendages are not defined by existing conditions. Their office is to perfect the animal form; they are true prospective contrivances, implying, under strict anatomical necessity, a subsequent and more perfect condition of organic life. We cannot hatch a rat from a goose's egg (one of the Author's pleasant dreams); because, during every stage of incubation there are organic contrivances within the egg which have a prospective reference only to the structure of a bird, and apply not to that of any mammal. There is, therefore, so far as we can comprehend it, no obscurity in this part of nature's workmanship, nor any semblance of confusion or structural interchange between the different Classes of the living world.

Again, there is no intelligible contrivance for the production of a new species during the progress of fœtal growth. Many larvæ (for example the tadpole) can, for a time, support an independent life. But such animals are immature, and, without one exception, unfruitful. Their life may be destroyed, or, within limits, may be lengthened. They may be well or ill-fed, they may be large or small, but we cannot change their nature. Speaking of the tadpole, our author tells us that (under artificial treatment) "this progeny of a Reptile literally becomes a Fish; and transition of species is thoroughly realized, although in retrogression*." We deny that in this (or any similar) instance there is even an approach to a specific transmutation. The tadpole contains not the organs most essential to the structure of a perfect fish: and if its organs be defective on the one hand, so are they excessive on the other; for it contains within the framework of its body certain organic appendages from which it cannot be separated without death; and these appendages, by a strictly anatomical necessity, produce in due time the mature organic structure of a frog. The loose unscientific statement of the Author may be fitted to startle a superficial reader, but it contains not the elements of exact truth, and is only an example of that grand anatomical fallacy to which I have before alluded.

---

* *Vestiges of the Natural History of Creation*, 6th Edition, p. 226.

Again, the Author tells us (p. 224), "that we see nature alike willing to go back and to go forward. Both effects are simply the result of the operation of the law of development in the generative system." No one denies the great modification of specific types from a change of external conditions: but when he appeals to a law of development in the generative system which produces a change of species, either on the ascending or descending scale, we can only state in reply, that we utterly deny the existence of any such law, or of a single fact whereon to build it. So far from being based on a wide induction of facts, (and without such induction the verbal expression of a material law is no better than a mockery), the Author has not advanced so much as one unequivocal instance in support of it. The voice of all nature is against him.

But he has published his *Explanations, a Sequel to the Vestiges, &c.*, wherein he attempts to vindicate his views on the fœtal question. However much I may wish to avoid details, I will notice these *Explanations* in a few sentences.

(1) Has he answered the Reviewer's statement—that, in the very beginning of fœtal life there are phenomena that seem of themselves to imply definite and specific differences? He has not, I believe, even made the attempt.

(2) Has he answered the objection of the Reviewer—that, during the early progress of fœtal life, in

animals of the higher grade, three great Divisions of the animal kingdom are passed over without any corresponding fœtal type? He has made the attempt, and failed. We learn, he tells us, from the *Bridgewater Treatise* of Dr. Roget, that animals of a high grade exhibit, during their early fœtal progress, "a marked resemblance to the lowest animals of the same series." This may be true in a popular sense; but it is not anatomically true that these resemblances produce any confusion of species. The quotation proves nothing to the Author's purpose, and I know that Dr. Roget repudiates its application.

Again, he tells us, "the Reviewer states what is not true, if any faith is to be placed on the first authorities of the age . . . for have we not seen Mr. Owen affirming that the human embryo is first *vermiform?*" In the sentence from which this word is taken Professor Owen wrote in figurative language, and never meant to be anatomically exact. The first "organic streak" (or rudiment of a back-bone) may well be called vermiform: but it has not the structure of a worm; and it has appendages, that are as true a part of the nascent fœtus as the "streak," and involve a development of the higher grades of animal life. I have consulted Professor Owen, more than once, on the very point in question, and he confirmed every atom of the Reviewer's statement: nay, so exactly did his language agree with that of the Reviewer, that one seemed almost the echo of the other. With the interpolation of one single word (to prevent a quibble) I can, with the utmost confidence, repeat the assertion of the Reviewer—that among the vertebrata, during the early fœtal progress, "no physiologist has observed the shadow of any change assimilating (anatomically) the nascent *embryo* to any of the *Radiata*, *Articulata* or *Mollusca*."

(3) Has the Author replied to the statement of the Reviewer—that the fœtus of a mammal never breathes by gills, and is never, for an instant, in the true anatomical condition of a fish? He has done no such thing. He has contented himself with repeating his early blunder.

(4) Has he replied to the argument of Dr. Clark; and especially to his statement respecting the fœtal changes in the heart of a mammal? He has not, so far as I know, even made the attempt; and in his sixth edition (*Vestiges*, p. 207) he has gravely repeated his old blunder, forgetting the labours of the great anatomists formally quoted against him by Dr. Clark!

(5) Has he replied to the concluding remarks of Dr. Clark on the apparatus supplied by nature for the full maturity of the fœtal form? They are all passed over. But he informs us (*Explanations*, p. 108) that his theory has been misrepresented. He only meant to state that "there is a resemblance in general character between the particular embryotic state of being and the mature condition and form of the appropriate inferior animal," &c. He is, undoubtedly, the best interpreter of his own words: but they sounded differently in the ears of all who read them; and by himself they were applied, again and again, as if they were used in the very sense given to them by the Reviewer.

While speaking of the fœtal changes of a man, the Author tells us, in his last edition, "that the organic structures pass through conditions generally resembling a worm, a fish, a reptile, a bird, and the lower mammalia," &c. But he has not always expressed his meaning with like caution; and I may remark that "general resemblances" will not serve his purpose. His scheme of development supposes that the fœtus passes through the ascending organic scale—that it may be thrown off by abortion, and live and propagate its likeness on an inferior grade—that a Reptile, in this way, may produce a Fish, or a Mammal may produce a Reptile. On the other hand—that by improved incubation or gestation the offspring may rise on the organic scale above the parent's grade—that a goose's egg (for example) may produce a rat. This theory (if it deserve the name of theory) has no meaning, unless we take for granted that the fœtal changes of a mammal do produce something more than *general resemblances*. They must produce fœtal conditions *identical* with the several grades of animal life, which they are, by the hypothesis, assumed capable of generating. It was against this view that Dr. Clark's argument was directed: and, so far as I know, not the shadow of a reply has been given to it. But the Author adheres to his scheme, and will adhere to it so long as a new hypothesis can give it any semblance of consistency. Should every alleged fact be smothered under the weight of opposing evidence it matters not. The doctrine of *specific transmutations*, and of a generative law of fœtal development, whereby a pair of animals may produce a progeny either lower or higher than themselves on the great organic scale of nature, may still be upheld by our Author: for he ventures to tell us, "though no such changes have taken place since the beginning of the human family, and though this knowledge were never to be clearly attained, it would not much affect his argument, provided it be satisfactorily shewn that there must be some such power within the natural range of things!" I need not tell the academic reader that this is not written in the spirit of inductive truth. To strive against it would be a waste of strength. We cannot wrestle with a cloud.

I will endeavour to conclude this part of my Preface with the following general summary. From the harmony and order of the material world, we infer the existence of an intelligent power superior to the dead matter which surrounds us. This is admitted by the Author of the *Vestiges:* but in making this admission he is in direct antagonism with the whole school from which he borrows his philosophy. From the adaptation of the several parts of nature to one another, we infer a prescient wisdom in the great First Cause. This First Cause we clothe with personal attributes; we comprehend them all under our conception of the Godhead; and in this way we refer all the phenomena of the visible world to the fiat of his will, and the continued exercise of his sustaining power. In drawing this conclusion we use the voice of Nature, and we only speak of her as she is reflected in the mind of man. For man, by the exercise of his own forethought and will, can produce a series of orderly phenomena—feebly resembling the works of God, however inferior to them in vastness, in complexity, and in the sure indications of power and wisdom: and humble as man's faculties may be, he does know how to separate such phenomena, wheresoever he meets with them, from the results of accident, and from the rude effects of second causes that come not under law, and are unmodified by the prescient will of beings like himself.

In no part of nature are the wisdom and provident care of God more clearly seen than during the progress of fœtal life. The eye is formed in the dark recesses of the womb before light has ever touched the nerves of sight. The ear also is prepared in darkness, while the nascent being is surrounded by water, and before the pulsations of the air have ever reached its bodily substance. Neither the immediate wants of the growing embryo, nor the conditions of the surrounding matter, imply, by any conceivable necessity, the existence of such organs as the ear and the eye: and we but mock the intellect of man when we tell him that they are produced only by "the elective affinity of organic elements," and that they may be compared (as phenomena of the same order) to the mechanical actions of matter upon matter, or to the results of a chemical combination. Whatever there may be that is either chemical or mechanical in our fœtal organs of sense, they shew prospective contrivances which enter not into our conceptions of what is chemical or mechanical, and have reference only to future conditions of life after the fœtus has passed into what may be truly called a new living world. In like manner, while in the fœtal state, neither man nor any mammal has need of a double heart. The fœtus is resting in a dark chamber surrounded by a watery fluid; and a simple heart we believe (on the analogy shewn to us by the hearts of fishes) would best suit its state of being. A simple heart is given to it, not however the heart either of a fish or a reptile; but a heart with a structure of its own, and with appendages —a true and inseparable portion of itself—whereby a new double heart is gradually laid down and perfected. When this complicated apparatus has reached perfection, and the fœtus becomes capable of supporting an independent life, *then* it passes into the air, and the double heart begins from that moment its predestined organic movements. I have only stated facts which have been stated a thousand times before. I have stated them as plainly as I can; and I have given them their true physiological and moral meaning. *Thine eyes did see my substance yet being imperfect, and in thy book all my members were written, which in continuance were fashioned, when as yet there was none of them.* This is the voice of inspiration, and reaches the profoundest depths of true philosophy. The knowledge of man can neither add to its meaning nor diminish its strength. It teaches not that the moral parts of our nature are sunk under the material; neither does it tell us that the material are beneath the contemplation of the moral;

but it unites together the moral and material in bonds which the power of man will never tear asunder.

All living Nature then, so far as I can understand her language, or can read the interpretations of it by other men, contradicts the theory of spontaneous generation and progressive development. Spontaneous generation (in our Author's sense) has not one good unambiguous fact to rest upon. The theory of development has no firmer support in nature: and the only pretended fact which has any clear and unequivocal bearing on the question, and is put forth by the Author of *The Vestiges*, with the view of destroying the separation between vegetable species, turns out to be nothing better than a misconception and a blunder*.

It has been said, however, that animals undergo a progressive development while they pass through their successive fœtal conditions in the womb. True! and many of them, while in the *larva* state, leave the ovum, and are enabled for a time to support an independent life. But *larvæ*, when they leave the ovum, have no sexual development; and can never without a miracle (for what is a miracle but a violation of an ascertained law of nature?) have the power of generating any new continued forms of animal being. And were it true, by a miracle in nature, that any one of them were suddenly endowed with this power, the development would then be on a descending, and not on an ascending scale. Again, we have been told that animals may, under favourable conditions, and by a longer period of gestation, produce some being of a higher order than themselves: that a beast (for example) may in this way be hatched from a bird's egg; and that woman may hereafter make perfect the organic scale, by producing some being of higher attributes than man! What beings *may* be produced out of the abortive imaginations of the human brain, is not a question worth one moment's pause. So far as nature is concerned, philosophy has nothing to do with what may be, but with what is.

---

* Supplement to the Appendix No. IV.

§ 4. *Organic Phenomena of Geology, and general remarks on their bearing on the Theory of Development.*

Leaving the consideration of living nature, another question may be started: Are there, among the old deposits of the Earth, any traces of an organic progression among the successive forms of life? I think there are such traces; and to explain my meaning, I will quote an extract from an Anniversary Address read by myself before the Geological Society of London, in 1831. "I think that in the repeated and almost entire changes of organic types in the successive strata of the earth—in the absence of mammalia in the older, and their very rare appearance (and then in forms entirely unknown to us) in the newer secondary groups—in the diffusion of warm-blooded quadrupeds (frequently of unknown genera) in the older tertiary system; and in their great abundance (and frequently of known genera) in the upper portions of the same series—and lastly, in the recent appearance of man on the surface of the Earth (now universally admitted);—in one word, from all these facts combined, we have a series of proofs the most emphatic and convincing,—that the existing order of nature is not the last of an uninterrupted succession of mere physical events derived from laws now in daily operation: but on the contrary, that the approach to the present system of things has been gradual, and that there has been a progressive development of organic structures subservient to the purposes of life.

"Considered as a mere question of physics (and keeping all moral considerations entirely out of sight), the appearance of man is a geological phenomenon of vast importance—indirectly modifying the whole surface of the earth—breaking in upon any supposition of zoological continuity—and utterly unaccounted for by what we have any right to call the Laws of Nature. If by the laws of nature we mean only such manifestations of power as seem good to the Supreme Intelligence, then there can be no matter for dispute. But in physical questions such terms as 'the laws of nature,' have a proper reference only to second causes; and I may ask, by what operation of second causes can we account for the recent appearance of man*?"

I wish to make no change in the previous extract. Its language might be improved, and brought into more exact accordance with the advance of knowledge during the last twenty years: but it expresses, with sufficient clearness, what may be called a great historical truth;

---

* *Proceedings of the Geological Society.* London, Vol. I. p. 305.

and the words "progressive development" have (in the sentences just quoted) no reference to any theory either true or false. At the time it was written I neither believed in the spontaneous generation, nor in the specific transmutations of any portion of the animal kingdom. Let no one, therefore, quote this passage without allowing its author to define the meaning of his own words*.

Three great divisions of the fossiliferous strata. Considered under the most general and simple point of view, the fossil-bearing strata of the earth admit of an arrangement into three great divisions; the Primary, or Palæozoic; the Secondary; and the Tertiary.—In the lowest groups of the Primary division neither land-plants nor air-breathing marine animals have yet been found; but other marine animals are found in abundance, and some of them are of the very highest organic type. In the upper groups of the same division we have a noble terrestrial flora; and coeval with that flora were Insects and Reptiles. In the very highest group (the *Permian*) bones of Reptiles had long been discovered: but remains of the reptile Class have lately been found also in the Carboniferous strata.

Among the Secondary rocks—including under that name all the formations, from the new red sandstone

---

* A historical development is, or ought to be, a record of successive facts in the past phenomena of the organic world. A *theory of development* may be true or false; but must not be confounded with a mere statement of the successive facts on which it is supposed to rest. In the remaining portions of this Preface the word *development* may sometimes be used historically; but the words *theory of development* are always used with an expressed or implied reference to the hypothesis of a progressive natural development by specific transmutations.

(*Trias*) to the chalk inclusive—we have, in addition to all the lower grades of the animal kingdom, a few Birds and Mammals. But the Birds and Mammals are so few and far between, that we can arrange them chronologically on no regular organic scale. Two strange genera of terrestrial Mammals shew themselves among the fossils of the lower oolites: but not one remnant of a terrestrial Mammal has been yet discovered among the higher Secondary rocks. No cetacean bone has yet been found in the lower oolites. One doubtful example of a cetacean bone occurs in the middle division of the oolites; but this form of organic life disappears again; and during the long epoch of the cretaceous series (forming a prelude to the tertiary system, in which mammals' bones are abundant) not one cetacean bone, or one fragment of any other marine Mammal, has yet been found.

In the Tertiary division bones of Mammals occur in abundance; and in the highest beds of the series we are introduced to many existing types of the organic world: but the remains of Man have not yet been discovered even among the highest of the regular tertiary deposits.

It is true that the phenomena of geology are widely separated, broken, and disjointed; and the progress of knowledge may compel us to modify some of our present conclusions, so far at least as they are built upon the assumption of negative facts. In an advancing science, our theory may be true or false, perfect or imperfect: but as it professes to start from ascertained phenomena, so must it continue to be in co-ordination with such facts as come before us during our progress, or it is good for nothing.

Do, then, the ascertained phenomena of geology suggest a theory of development based on any known law of organic nature? So far as the theory is concerned the real questions for discussion are such as follow.—Are the animal remains of our successive groups of strata presented to us in such an order as to suggest a theory of natural development by transmutation from one organic form to another? Are the Genera and Families of the old world so ill defined as to pass one into another by insensible gradations? Are the organic intervals between the different Orders and Classes of the animal kingdom so far interpolated by new forms of nature, as to lose all semblance of reality and permanence, and to shew that all our systematic lines of separation are but the artifices of immature knowledge—that Order may spring from Order, and Class from Class, in the way of natural generation? Do the organic types of the old world follow one another chronologically, in such a manner as to arrange themselves on any conceivable organic scale, whether simple or complicated? To all such questions I can do no more than return a most unqualified negative: and I may add, that the Genera and Families of the old fossil world are more abruptly defined, and exhibit fewer connecting links, than in existing nature. But it is, I fear, impossible for me, within the limits of this Preface, to discuss such questions effectually.

The materialist school must, in some form or other, give an affirmative answer to these questions. And how have they given even the semblance of truth to their dogmatic theory of development? By first discarding the pregnant facts of living nature—by explaining the known by the unknown, and thereby confounding the very nature of true inductive evidence.—By reconstructing, hypothetically, a chain of being out of the organic fragments of the old world; and then taking this chain, every link of which is hypothetical, to bind together their system of nature; thereby discarding the first principles of sound logic.—By pretending to rescue nature from the province of miracle and fable, while their system at every step is both fabulous and miraculous: for neither is it historically true to nature, nor is it grounded on any ascertained natural law. The imperfection of our knowledge may be a good reason for withholding any attempt at theory: but if we do venture to theorise it must be in conformity with such results as science has established by firm evidence. And, assuredly, the imperfection of our knowledge can never justify us in publishing our idle dreams, and then trying to make all nature bend before them.

The materialists have not, however, stopped short in the exhibition of bad logic: they have given us both an imperfect, and an erroneous enumeration of facts and phenomena: and, worse still, they have so disturbed the chronological order of phenomena, as to gain a response from Nature the very opposite to that which she addresses to our senses. I accuse not this school of bad faith; but I do accuse them of a spirit nearly touching on fanaticism. With incomparable credulity in the admission of any story that seems to make for the honour of their idol, they are deaf to the plain speaking voice of Nature. Hypothesis is to be upheld, while facts are to be kept in abeyance.

"My system may be true," says the Author of *The Vestiges*, "though one half the illustrations presented at its first appearance should be wrong." Such a sentence could never have been written by a man who had any sober conception of the nature of inductive truth. He exhibits, in his own person, the very worst faults of the school in which he has enrolled his name: for he is credulous in the admission of supposed facts, careless in the analysis of physical evidence, and throughout the pages of his book exhibits a more intrepid use of "the circular logic" than is to be met with in the works of any other English writer on a subject of modern science. When convicted of an imperfect enumeration and false arrangement of geological phenomena, it is not enough to tell us in reply that he borrowed his facts from others: if he adopted them without marks of reference or quotation, interpolated them with observations of his own, and drew his own conclusions from them; then was he, from first to last, as responsible for them to the public, as if they had all been of his own invention.

The real question at issue is this; Do the organic types of the old world, when taken with all the conditions under which nature has placed them before our senses, suggest the "theory of development?" My negative reply to this question would be of small value were it not confirmed by the conclusions of those who, during the last thirty years, have been labouring in the field. They tell us that this theory is neither proved, nor made probable, by the phenomena of Geology. On the contrary, they affirm, almost with one voice, that the organic phenomena elaborated in the past history of the earth throw most formidable difficulties in the way of this theory; even admitting that it is made probable (which it assuredly is not) by a fair induction from the phenomena of living nature. They are a body of hard-working and truth-loving men, who, on points where men may reasonably differ, exhibit many shades of opinion; but on the present question they appear to speak with one consent.

So far from starting with any natural prejudice against this theory, one large section of their body has boldly adopted views which would gain in harmony and consistency by its acceptance. The Huttonians tell us that there is a mechanism within the earth which explains all past changes in the distribution of land and sea, and brings under one natural system of causation all the successive deposits of Geology. Could they point out to us any corresponding material cause that so modified the successive types of animated nature as to bring the organic and mechanical changes of the earth into a good natural co-ordination, their system would then be theoretically perfect. I need not tell the reader that Sir Charles Lyell has, in this country, long stood at the head of the Huttonian school, and directed the best efforts of his life to its illustration. He is no timid speculator; yet he rejects the theory of organic development (however gracefully it would lend itself to his general views) because he finds it untrue to nature.

Authors who have only glanced at the vestiges of our ancient monsters, and never dared to track so much as one of them to its lurking-place, may, perhaps, tell us that Geologists are in fetters—that they are so embarrassed by a load of facts that they have no power of onward movement—that they have so dimmed their sense in the dark chambers of the earth, that they can hardly endure the light of day. Is there then "no speculation in their eyes?" Are they so cowardly a body that they dare not look beyond the material forms to which they cling? Their history tells us a far different story; and we learn from it that they have too often grasped at consequences beyond the reach of the ground on which they stood; and that their besetting sin has too often been a rash and intemperate spirit of speculation.

Who have been the great leaders in our knowledge of the laws that govern the material world? We may reply: the men without exception, who have been great observers themselves, or (at the very least) have learned to appreciate, and embody in their own knowledge, the labours of the great observers who have gone before them. Every new fact is a spark fitted to kindle in the mind of man some new train of general thought; so that the best experimenters have ever been the most successful speculators. Theory is not the idol, but the animating soul of advancing knowledge; and is then only mischievous when it is set up that it may be worshipped, as if it contained the highest truth; though it be built on an untried foundation, and raised only to the level of our shallow knowledge. Most of all is it mischievous when it teaches us to turn away from, and, it may be, laugh at the toils of those who are working onward, in good hope, along the only road that has ever led to the discovery of material truth.

But it may be said that our practical geologists are wanting in that knowledge of natural history and physiology which would make their opinions of decisive value on the theoretical question of development. To such a remark I would oppose the great works of Cuvier, who, after twenty years of labour in deciphering the extinct organic forms of the tertiary rocks of France, came to the conclusion that, in accordance with no known law of nature, could the extinct animals of the tertiary period be regarded as the true progenitors of the nearest analogous forms of animal life in the present world. He did not overlook the theory of development; but he denied its truth. In like manner, Agassiz, after classifying with consummate skill, and arranging in chronological order more than a thousand extinct species of fossil fishes, derived from all the successive deposits, (commencing with the *primary*, and ending with the newest *tertiary* strata,) found that his successive fossil groups, when so arranged, belonged to no natural ascending scale, and that no one group could be derived, on any known law of generation, from the group which went before it. He, therefore, (whatever may have been his early opinions, of which it would be unfair to judge from a few figurative sentences) rejected the theory of transmutation and development, as both inadequate and untrue. Owen, again, was a comparative anatomist of consummate skill before he turned his thoughts to the study of palæontology. How greatly he has added to our knowledge of the extinct forms of animal life, during the ancient epochs in the history of our globe, need not be stated here: but we know, from his published works, that he also repudiates the theory of development as both inadequate and untrue.

Were the theory true in the living world, geology would oppose to it, at every step, the most formidable difficulties. Take, for example, the chronological arrangement of the Reptile Class, so far as we can collect it from the works of Owen; and when so arranged the several Orders, Genera, and Species, cannot be brought into accordance with any conceivable ascending organic scale, whether simple or complicated; neither are the organic groups so arranged that the species of one epoch can (by any rational law of transmutation) be derived from those of the epoch immediately preceding it.

Lastly, I may here refer to the published works and well-known opinions of Professor E. Forbes. He has long been known as an accomplished and philosophical naturalist, and as a most unwearied and original investigator into the causes that have modified the distribution of our living organic types. For a few years he has devoted the best efforts of his skill to some of the vital questions of Geology, by labours in the field as well as in the closet: and taking as his guide the great facts that influence the distribution of the living inhabitants of the sea, he has so explained and harmonized the distribution of organic types in the old strata of the earth, as to put them in an intelligible sequence, and to modify the views and language in which the successive phenomena of geology must now be placed before us. It adds a great value to his opinions on the theoretical question of development, that he has personally examined some of the oldest fossil-bearing strata of the geological series, and has seen the order in which the earliest known organic types are arranged by the hand of nature: and assuredly it is among these old deposits, if any where on earth, that the theory of development ought to derive its most unambiguous illustrations. No one can doubt his knowledge of the extreme modifications to which animal life is now exposed by a change of physical conditions; and no one will doubt his boldness as a theorist, or his capacity for the apprehension of the highest form of physical truth. Guided by facts, and the analogies of living nature, he denies the reality of any development whatsoever directly depending upon time. He contends, that no modification of specific types, and no rational theory of transmutation, can account for such a succession of organic types as is seen in the old strata of the earth. The succession implies nothing less than a creative power bringing the forms of organic life into co-ordination with the successive physical conditions of the earth. It is not my wish to misrepresent his views, and I believe that I have stated them correctly.

In one sense it may be true that time has influenced the development of organic life. For during past epochs, the superficial temperature of the globe, the distribution of land and water, and, in one word, all the great physical causes which modify the distribution of the animal and vegetable types, appear to have undergone a succession of slow, gradual changes: and while we are contemplating these changes, we seem to be ascending step by step to the conditions of the existing period. On this view we might naturally expect the organic types of the old world to exhibit a development towards the forms of living nature: not, however, simply as an effect of time; but rather as an effect of physical conditions brought about gradually during the long lapse of time. And we may remark by the way, that this conclusion is equally true whichever theory we adopt; whether we affirm that new forms of animal life were produced by physical necessity out of the conditions, or that a creative power adapted these new forms to the gradually changing conditions.

As no *fauna* can exist without some *flora* to support it, we might conclude, without any further evidence, that some species of the vegetable kingdom must have preceded the animal. In like manner, however imperfect may be our ancient organic records, we might conclude that some of the herbivorous tribes of the mammal class must have preceded the carnivorous. Reasoning of this kind may be admitted without scruple, because it is based on what we know of existing nature; and the facts of geology, notwithstanding the imperfection of its documents, seem to be in accordance with these sure elements of our knowledge. Admitting, however, all which has been stated—that vegetables preceded animals; and, so far as we have physical evidence bearing on the question,—that fishes came into being before reptiles,—reptiles before mammals—and that man is one of the last beings in the order of creation; what does all this prove for the theory of development? Absolutely nothing; unless it can be farther shewn that the genera and species of the several Classes have been produced successively on some natural, ascending scale. And were this proved, (which it is not,) how shall we ascend by any natural means from Class to Class, unless we can shew some connecting links between them, indicating a slow chronological progression, and a series of "modest steps," whereby one Class may seem to slide into another. Geologists, with one voice, deny that there is any such evidence of progression. They point to continual breaks in the organic scale; and they believe that the highest development of each Class is a fact not dependent upon time, but upon physical conditions. With these remarks I might end this imperfect comment on the theory of development: but physical truth depends not upon authority, and the reader may ask for an enumeration of, at least, some of the facts that have a direct bearing on the question in debate.

§ 5. *Animal and vegetable Remains of the Primary or Palæozoic Division.*

Oldest fossil groups.—Have geologists discovered any defined group of strata marking the period when organic life first began? We shall never, I think, be able to give any thing better than a doubtful answer to such a question as this. Sir R. I. Murchison thinks he has seen such a group in Scandinavia. It contains *Fucoids*, rests unconformably on crystalline or metamorphic rocks, and underlies all the other palæozoic deposits of the country. This discordancy of position proves a want of continuity in the geological sequence, and therefore greatly damages the conclusion, that this group contains the earliest traces of organic life.

Better evidence bearing on this question is, perhaps, found in Cumberland; for in the Skiddaw slates, at an enormous depth below the Silurian groups, are found certain strata with impressions of *Fucoids* and *Graptolites*. These are, perhaps, the oldest fossil beds of the British Isles; and below them are other beds of great thickness, not metamorphic, and fit for receiving impressions of organic remains, yet without any traces of animal or vegetable life. These lower strata finally pass into a metamorphic condition, and rest on Granite.

No unequivocal traces of this group are found in North Wales, nor is it, I believe, enumerated (as a distinct group or system) in the vast descending series of palæozoic rocks in North America: and it certainly appears not in any of the well-described portions of the continent of central and western Europe*. Such are our meagre details respecting this supposed protozoic group. Should its place be ever established, we may then expect to find within it the traces of that ancient flora which formed the necessary base of the first germs of animal life.

Leaving all hypotheses respecting the most ancient traces of animal or vegetable life, we may next inquire in what form the types of the animal kingdom present themselves in our older Palæozoic strata.—Commencing with the well-defined upper Silurian strata, and descending to the lowest beds containing traces of animal remains, we have in the British Isles a series of deposits not less than twenty or thirty thousand feet in thickness; and below them all are beds of great thickness (not crystalline or metamorphic), in which animal remains seem gradually to disappear. This description, with a very slight verbal modification, may also be applied to the older palæozoic deposits of the North of Europe and North America. In some beds of North Wales (at a vast depth below the Upper Silurian strata) are found *Lingulæ*, *Tellinomyæ*, and *Graptolites;* and a very little higher are *Trilobites* and *Graptolites.* These are among the lowest animal remains of the British series; and no Crinoïdea and no stony Corals (though admirably fitted for fossil preservation) have been found among them. This little group would hardly deserve a separate notice were it not true that *Lingulæ* and *Tellinomyæ* are among the lowest animal fossils of North America.

---

* This note is addressed only to geologists, and would be quite out of place were I to introduce any details.

In the year 1824 I found one or two places where the Skiddaw slates were stained with carbon, which was probably of vegetable origin: and about two years since J. Ruthven, of Kendal, at my request, re-examined these carbonaceous slates, and found in them the fossils above mentioned. I wish to bring the old dark-coloured slates of the Menai Straits into co-ordination with the Skiddaw slates, but the comparison is defective from the want of fossil evidence. The older palæozoic sequence in North America is almost identical with that of the British Isles. This opinion was confirmed, in the early part of the present year, by Professor H. D. Rogers (one of the greatest American authorities), who personally examined the Woodwardian collection, in which a very large series of British palæozoic fossils is arranged stratigraphically. During the past year I examined the border-chain of Scotland that runs from St Abb's Head to the Mull of Galloway. The evidence given by the fossils is not comparable in clearness and fulness to that derived from Cumberland, Wales, and the noble sections of North America: but I believe that Mr M'Coy, after very carefully sifting the evidence, has seen enough to prove that the animal sequence in this border-chain, so far as it goes, is almost identical with that given in the great works of the United States Geological Surveyors.

We have seen that the lowest well-marked *animal* remains discovered in this Island are *Graptolites*, *Tellinomyæ*, *Lingulæ*, and *Trilobites.* Among rocks, apparently of the same age, in America, are *Lingulæ* and other *Brachiopoda*, followed by *Tellinomyæ*, *Orthoceratites*, &c.; but without *Trilobites.* Should we from this infer that Trilobites came sooner into being in England than in North America? Certainly not. The evidence offered by our earliest fossil-bearing groups is far too imperfect to bear out any such conclusion. But (says the Author of *The Vestiges*, *Explanations*, p. 39,) "The remains of inferior animals may be found on some lower level, in some as yet unexplored place not far off, so that a time-interval may then appear to allow for progressive development." True! Such animals *may be hereafter found*, whether the theory be true or false. The question at issue is this. Do the organic phenomena of geology suggest the theory of development? We meet the question by a direct denial, and an appeal to facts. And it is no reply to tell us, in return, that other facts *may hereafter be brought to light* so as to modify the nature of the evidence before us. This is the inevitable condition of every advancing science, and is an excellent reason for using much caution in the propagation of any positive dogmatic theory.

Leaving the necessarily doubtful evidence respecting the first vestiges of organic life, we have an enormously thick ascending series of deposits, terminating with the Llandeilo and Caradoc groups of the Silurian system. After what has been stated, it would be somewhat incongruous to call the whole series *Protozoic*, but, provisionally, I may call it Cambro-Silurian; and it includes all the oldest known fossil-bearing groups of North America, and of the north of Europe, under whatsoever names they may hereafter pass. In this vast series we have many portions without fossils, and many wherein they abound. Some of the species ascend from the lowest groups to the highest; but new species appear to have been gradually added, so that the higher groups are, on the whole, more fossiliferous than the lower. Cephalopods and Crustaceans are seen among the lower groups. It is not true that the Crustaceans are all of a humble type. It is not true that the first Cephalopods are small and of a lower type than those which follow them among the higher Palæozoic groups. In North America some of the very old Cephalopods are almost gigantic. Neither is it true that the fossil species, considered as a whole, conform chronologically to any natural ascending scale of animated nature. Bivalves and univalves are seen together; and though the former as a general rule, abound more than the latter, yet in certain spots the univalves take the lead. Professor E. Forbes explains this fact by reference to local conditions, which produce an analogous distribution among the living inhabitants of deep seas. There is no confusion of species. Those which first existed do not slide into those which are superadded, by insensible gradations, either on an ascending or a descending scale; and many of the species have a great vertical range without the least modification of their specific characters. On the other hand, while on the same geological line, and among deposits of the same date, certain fossils (without changing their specific types) do undergo, like the kindred animals of the present sea, certain variations of form arising out of changes of marine depth, or changes in the nature of the marine bottom. The hard Radiata are rarely, if ever, found in the very lowest groups; but are in great abundance in the upper: and the different Families in this division of the animal kingdom do not appear in any natural order of development. When we place them chronologically, as they shew themselves among the ascending deposits, their arrangement is not anatomically natural, and is sometimes on an inverted scale. The same remark applies to the other groups of the animal kingdom. It has been said that the Cephalopod may perhaps be derived by natural transmutation from the Pteropod, and that such an arrangement would fall in admirably with the theory of development. Unfortunately for this theory, the Cephalopod, so far as we have any direct evidence to rest upon, appeared before the Pteropod.

Do I then affirm, from such facts as these, that we know the exact order of creation? I make no such assertion: but I do affirm, and with great confidence, that the organic sequence, brought to light among our oldest palæozoic strata, does not, when closely examined, suggest the theory of development. Were the theory proved, or made probable, among the phenomena of living nature, it might then, with some show of reason, be taken as our guide while we are endeavouring to unite together the organic fragments of an older world; and we might endeavour, by help of it, to explain away what we thought anomalous in the order of our oldest fossil types. But to take this theory for granted, while living nature is in most positive antagonism with it; and, by help of it, to interpolate our oldest geological documents, (sometimes without any pretended evidence, and sometimes in the very teeth of most positive conflicting evidence,) so as to obtain from them a natural ascending scale in accordance with the scheme of development; and, when we have done all this, then to go back to the phenomena of living nature, and to apply this theory to their interpretation, is as flagrant an instance of bad logic as is to be found in the whole catalogue of human fallacies.

The first appearance of fossil fishes may, in the next place, be noticed. In the "Silurian system" we have a description of several species derived from the upper Ludlow-rocks, which appear at the base of the Old red sandstone. Collectively, the species belong to a very high organic type, and among them are two Cestracionts. A Cestracion was afterwards found by Mr Brodie in the Wenlock-shale.

The extreme rarity of such remains in our oldest fossil-bearing groups, and their entire absence from some of them, is accounted for by Professor E. Forbes, on the supposition (plainly indicated by the whole Fauna of the period), that our oldest Palæozoic strata were the deposits of a deep ocean; and probably below the descending limit within which Fishes are found to inhabit our present seas. Be this as it may, all our most ancient fossil Fishes belong to a high organic type; and the very oldest species, that are well-determined, fall naturally into an Order of Fishes which Owen and Müller place, not at the bottom, but at the top of the whole Class. No man living is infallible, whatever may be his knowledge of nature; but it is utterly incredible that these two great anatomists (with no hypothesis to warp their judgment, and in a classification founded, not upon one character, but upon a combination of all the united characters which minister to the perfection of an organic type,) should have so egregiously blundered as to mistake the whole order of precedence, and to place the lowest grade of Fishes at the top of their ascending scale*.

Respecting some of the oldest families of fossil fishes, it may be said that our evidence is founded on nothing better than general analogy. But how are we to advance one step in the way of physical truth if we shut our eyes to the evidence of analogy? In the case of the Cestracionts we are not, however, left to mere analogy; for that family exists in our present seas; and its anatomy is perhaps as well known as that of any living fishes with which we are most familiar.

Anatomical details, are unfit for the nature of this Preface; but the facts just noticed were too important to be passed over in silence†. They prove that Fishes of the very highest organic type existed during the period of some of our old Palæozoic strata; and no Fishes of an inferior organic grade have been found below them. Facts more in antagonism with the theory of development could hardly be expressed in written language.

---

* Agassiz divides the whole Class of Fishes into four Orders dependent on the exo-skeleton, or the scales. The system is obviously artificial; but is excellently adapted to the classification of fossil fishes, of which (with limited exceptions) the exterior portions only are subjects of examination. His four orders are called Placoids, Ganoids, Ctenoids, and Cycloids. Müller and Owen have attempted a more natural classification, founded on the collective character of all the nobler organs, whether internal or external. In the scheme of Owen (who very nearly follows Müller), fishes are divided, on an ascending scale, into eleven Orders and six Sub-orders. The highest Order (No. 11) includes the whole tribe of Sharks, at the top of which stands the Cestracion—one of our very oldest fossil fishes. The eighth Order includes some of the most remarkable Ganoids of Agassiz, which are characteristic of the Old Red-Sandstone. See Owen's *Lectures on Comparative Anatomy*, Vol. II., read before the College of Surgeons in 1846.

† For a short abstract of the evidence on which depends the high organic place of the Cestracion, see the Supplement to the Appendix, No. III.

With some of these facts the author of *The Vestiges* was acquainted before he published his *Explanations*, and the more recent editions of his work. And what has he stated in reply? Absolutely nothing that has any bearing on the question of classification. It is true that *some* living cartilaginous Fishes are very low in the organic scale; but what has that fact to do with the place of Sharks and Cestracionts? It is also true that Reptiles, Birds, and Mammals, have hard bones; for their muscular structure requires the support of a hard skeleton. But who would dream of arranging them on any scale dependent on the percentage of phosphate of lime, or of any other earthy salt a chemist might extract out of their bones? A natural classification, to have any meaning, must depend, for its true support, on the collective relations of all the nobler organs—the very principle adopted by Müller and Owen in their arrangement of the whole Class of Fishes*.

---

* I will endeavour in this note to put before the reader one or two remarkable passages in Owen's *Comparative Anatomy of Fishes*, "Why, (says this great anatomist, when discussing the true organic place of sharks and other Plagiostomous fishes) the gristly skeleton should be, as it commonly has been pronounced to be, absolutely inferior to the bony one, is not obvious. The ordinary course of age and decrepitude is associated with a progressive accumulation of earthy and inorganic particles, gradually impeding and stiffening the movements, and finally stopping the play of the vital machine; and I know not why a flexible vascular animal substance should be supposed to be raised in the histological scale, because it has

From a consideration of such facts as have been above stated, Professor E. Forbes concludes, that the

become impregnated, and as it were petrified, by the abundant intus-susception of earthy salts into its areolar tissue. It is perfectly intelligible that this accelerated progress to the inorganic state may be requisite for some special office of such calcified parts in the individual economy; but not, therefore, that it is an absolute elevation of such parts in the series of animal tissues." (p. 146.)

Again : "The predaceous sharks are the most active and vigorous of fishes: like birds of prey they soar, as it were, in the upper regions of their atmosphere....They are the fishes in which the instruments of voluntary motion are the best developed, and in which the cerebellum presents its largest size and most complex structure" (pp. 147 and 188.)..."The gristly skeleton is in prospective harmony with this mode and sphere of life."... "Lightness, toughness, and elasticity, are the qualities of the skeleton most essential to the shark....To have had their entire skeleton consolidated and loaded with earthy matter would have been an incumbrance altogether at variance with the offices which sharks are appointed to fulfil in the economy of the great deep.—Yet there are some who would shut out, by easily comprehended but quite gratuitous systems of progressive transmutation and self-creative forces, the soul-expanding appreciations of the final purposes of the fecund varieties of animal structures by which we are drawn nearer to the great First Cause. They see nothing more in this modification of the skeleton, which is so beautifully adapted to the exigencies of the highest of organized fishes (the sharks), than a foreshowing of the cartilaginous condition of the reptilian embryo in an enormous tadpole, arrested at an incomplete stage of typical development. But they have been deceived by the common name given to the Plagiostomous fishes. The animal basis of the shark's skeleton is not cartilage; it is not that consolidated jelly which forms the basis of the bones of the higher vertebrates; it has more resemblance to mucus ; it requires 1000 times its weight of boiling water for its solution; and it is neither precipitated by infusion of galls, nor yields any gelatine upon evaporation" (p. 147.)

In the next paragraph (pp. 147 and 148) he combats the opinion that Ganoid fishes are of a low organic type because of their hard dermal skeletons. "It is true that in the lowest class of Vertebrata we have the most numerous examples of a hard exterior skeleton. But some anatomists, in their zeal to trace the serial progression of animal forms, seem to have lost sight of all the vertebrate instances of the bony dermal skeleton, except those presented by the Ganoid and Placoid fishes. He must have been sunk to the low conception—that nature had been limited to a certain allowance of the salts of lime in the formation of each animal's skeleton—who could affirm, that in the higher Vertebrata the internal articulated skeleton takes all the earthy matter for its consolidation." He then oldest truly aquatic and marine fauna, of which we find traces among the monuments of geology, is, when taken collectively, not less noble than the corresponding fauna of our present seas; and that it offers not the shadow of any ground whereon to build a theory of development. The animals of this ancient fauna were created in accordance with the surrounding physical conditions; but did not, so far as we have any positive evidence, come into being in any natural organic sequence; neither have we the semblance of a proof that the several types of the animal kingdom underwent, during the long lapse of ages, any gradual elevation by specific transmutations on any ascending scale: and if all evidence for the theory fail us among the most ancient strata, in vain shall we seek it among the organic phenomena of any more recent epoch*.

Three great systems of deposits—the Devonian or Old red sandstone, the Carboniferous, and the Permian—follow the upper Silurian rocks in a regular ascending order, and complete the whole Primary or Palæozoic division of our fossil-bearing strata. In passing from one system to another, we perceive a great change in the old inhabitants of the sea; and where these

---

quotes the examples supplied by the Glyptodon and the Armadillos, which have internal skeletons as perfectly ossified as any other mammals; and concludes—"that the organizing energies, which perfect and strengthen the osseous internal skeleton, do not destroy, or in any degree diminish, the tendency to calcareous depositions on the surface, when the habits of the warm-blooded quadruped require a strong defensive covering." These extracts, combined with the notes in the Supplement to the Appendix, No. III., are, I trust, sufficient for their purpose.

* See the Supplement to the Appendix, No. V.

changes are greatest and most sudden, we find (almost without exception) distinct traces of vast physical revolutions which must have modified all the conditions bearing on the distribution of the organic types. For example: the upper Silurian rocks are not unusually deposited on the broken edges of the older groups. The Old red sandstone (or Devonian system) followed some of the greatest external movements that ever affected the surface of our globe. Many of its strata are made up of abraded fragments torn from the older rocks and deposited on their broken edges. The physical separation between the Devonian and Carboniferous systems is less complete; and in some places they seem to pass one into the other by almost insensible gradations. Lastly we have, as a general rule, a great physical break, and a very great organic change, as we pass from the Carboniferous to the Permian groups.

What conclusions may we draw from facts like these? That the great organic changes were brought about, not by gradual transmutation wrought among the specific types during a long lapse of ages, but by altered conditions to which the organic types were successively adapted. Time, considered as a separate element, and independently of changes in the physical conditions bearing on the distribution of organic life, does not appear, so far as we can reason on the evidence, to have produced any specific changes in the old kingdoms of animated nature.

I have no wish to describe at any length the three highest systems of the Palæozoic series enumerated in the preceding paragraphs; but I may be permitted to detain the reader, while alluding, through a few pages, to the Fishes of the Devonian system, and to the plants of the Carboniferous. Fishes abound in some parts of the Old red sandstone (Devonian system), and their natural history may be studied in the monograph of Agassiz. In the first four editions of *The Vestiges* we were told—"that the earliest fishes partook of the character of the lower sub-kingdom, the articulata,"—that the *Cephalaspis* resembled a *Trilobite*—that the *Coccosteus* had a jaw like the nipper of a lobster, its mouth opening vertically, contrary to the usual mode of the vertebrata—and that such facts compelled us to place these *Fishes* near the *Crustaceans.*

Now these supposed facts (as remarked in the *Edinburgh Review,*) "were only blunders and guesses made by the first observers before any good evidence was before them." And what reply has the Author given (in his *Explanations,* and his new editions of *The Vestiges*) to the Reviewer's comment? Nothing but a sneer at a clerical blunder committed in a single sentence where *Radiata* had been written for *Articulata;* and a strenuous reassertion of what is not anatomically true—that the Devonian fishes are low in the organic scale.

The whole strength of the Reviewer's comment consists in this statement;—that the fossil Fishes, both of the Devonian and Silurian strata, are of a high organic type, and that some of them exhibit the highest type of their whole Class; "and that in none of them is there the most remote affinity to Crustaceans or any other Articulata."..."On the contrary, that in many respects they make an approach to the higher Class of Reptiles—for example, in their dentition, and some of them in their ball-and-socket-jointed vertebræ." (Review, p 35.)*

It is in vain to tell us that 30,000 species of fossil Fishes *may* be hereafter discovered, and so arranged as to fall in with the theory of development. I advance no dogmatic theory; I simply appeal to facts, and affirm that they do not suggest the theory of development. On the contrary, they oppose to it, in the present condition of our knowledge, an evidence as strong as can be expressed in written words. The whole blame of a rash dogmatic hypothesis rests with my opponent. A theory is worse than nothing if it reflect not back the present condition of our knowledge. If it tell of laws, neither proved nor suggested by the lessons of experiment and observation, it is nothing better than imposture. It is not true, as was rashly stated in former editions of *The Vestiges*, that our earliest fishes were imperfect and half-abortive forms linked to the lower Class of Articulata: neither is it true, as continues to be stated by the Author, that the earliest fishes known to geologists were of a humble organic type. Neither is it true, so far as I have any knowledge of the subject, that the fossils, in any part of the world in which the Palæozoic strata have been well examined, follow one another chronologically in any true accordance with the hypothetical law of development. Such are the facts on which I join issue with a dogmatic hypothesis. The facts bear out my negative conclusion; they lend not support to the hypothesis, but flatly contradict it.

---

* It is impossible to discuss questions of this kind without details which are ill fitted for this Preface. I have, therefore, thrown into a note some additional facts bearing on the classification of our oldest fossil Fishes. Supplement to the Appendix, No. III.

Vegetable Types of the Palæozoic Period, &c. In order to speculate securely about the first beginnings of vegetable life, we ought to know more of the primeval condition of the Earth than is, or ever will be, revealed to us by direct physical evidence. Our oldest Palæozoic strata appear to have been deposited in a deep ocean; and in such formations we have no right to look for the vegetable spoils of the land. even though we hypothetically admit their existence in as great abundance as during any after period.

Again, the first elevated land *may* have presented nothing but a surface of bare rock utterly unfit to support any of the higher forms of vegetable life; yet, during the same early period, we can conceive it possible that marine plants may have flourished in abundance, and given support to the first animal inhabitants of the ocean.

Through the whole Palæozoic series we find innumerable examples of animal remains, entombed in the very spots where they once flourished, and exhibited to us in the very succession in which they once lived at the bottom of the sea, generation after generation. On the contrary, many of our vegetable fossils have been drifted from a distance; and on this account the successive organic types are far less clearly put before us in the vegetable kingdom than in the animal. In the midst of much doubt and uncertainty, one thing, however, is clear—that some forms of vegetable life must have flourished at the commencement of our very oldest Palæozoic strata; for no *fauna* could possibly exist without them: and, as a matter of fact, we do find, among our oldest known Palæozoic beds, occasional traces of fucoids and other marine plants; and the frequent absence of all such traces among our very ancient rocks may be accounted for when we remember, that marine plants, from the want of hard ligneous fibre, are but ill fitted for fossil preservation.

The oldest groups of our Palæozoic rocks are of enormous thickness—a fact which in itself explains their consolidation, and partially metamorphic structure. For we have only to bear in mind that they are many thousand feet in thickness—that each bed once formed the bottom of the sea—and that for every hundred feet of descent below the solid surface of the Earth, we have a right to suppose an increment of temperature of more than one degree of our common scale. In this way we may, without any appeal to a more direct Plutonic action, account for a great internal terrestrial heat—sufficient perhaps (when continued for long periods of time, and aided by enormous pressure) to solidify, and entirely mineralize, some of these ancient deposits. Mineral changes of this kind have, no doubt, obliterated innumerable traces of organic life; and I believe every sober-minded geologist will allow that the first commencement either of animal or vegetable types (and more especially of terrestrial plants) is wrapped in impenetrable darkness. I wish not to disturb the reader by ill-timed speculations on the most obscure and difficult points of Geology. What I wish to impress upon him is—that we cannot for a moment reason, with security, on the organic phenomena of any period, without taking into account the contemporaneous physical conditions of the Earth's surface.

Many of the upper Silurian rocks were formed in a shallow sea; and during the Devonian period (that followed immediately afterwards) we find traces of very widely-expanded deposits, which appear to have taken place near ancient shores, and in comparatively shallow water. The organic remains belonging to both these periods, whether of mollusks or fishes, bear out this inference.

Among the Devonian rocks of the continent of Europe land-plants, nearly agreeing with the Carboniferous type, were drifted abundantly from the neighbouring shores; and among the deposits of this age in the Rhenish provinces I found Coniferous wood, forms nearly allied to Lepidodendra, and Calamites. Some of the Calamites had the external portions so well preserved as to enable Mr M'Coy, in 1847, to determine their dicotyledonous structure*. In the British Isles this evidence is less complete; yet within them are spots, as we have already hinted, where we hardly know how to draw a line between the rocks of the Carboniferous and Devonian epochs.

---

* This determination has been since verified by Mr Dawes (*Geological Journal*, May 1848).

Through the Carboniferous period plants were in infinite abundance: and from the facts of Geology we learn, that the ancient sea was then studded with great tracts of elevated land surrounded by vast swamps that were covered with forests like those of a tropical jungle. In the part of the globe now occupied by North America there were, during this period, two great jungles, each of which was spread continuously over an area almost as great as the whole surface of the British Isles. It was not a continued period of repose. Changes of level, both of elevation and depression, destroyed the ancient forests, and buried them under fresh accumulations of drifted matter; and new forests grew over those which were buried under the new surface of the land. This state of things went on for unnumbered ages, till at length the Carboniferous formations were interrupted by newer changes, and perhaps still greater movements, which brought in the deposits of another system.

Judging from the vegetable types, the Carboniferous climate was tropical; and these types stretched so far north as to pass within the limits of our Arctic seas. Conditions so widely differing from those of existing nature implied, by physical necessity, a widely different *flora* from that now decorating the earth: and the modifying causes were not simply geographical; for the atmosphere must have gradually changed by the submergence of so many great forests and their fixation in successive coal-beds. But was this *flora* of an imperfect or half-abortive type, as if nature were only in the agonies of a struggle towards something higher and better? No such marks of imperfection are stamped on it; and we believe it to have been a perfect *flora*, in accordance with the conditions of its time. The several species, so far as we can reason on them through the analogies of living nature, shew no marks of imperfection: and many of the species and genera, which flourished in infinite abundance during the Carboniferous epoch, and never lived afterwards, are of strange but most complicated organic structure; so that some of our best botanists were long in doubt whether to place them among the monocotyledonous or the dicotyledonous divisions of their *flora*. If they be monocotyledonous, then are they among the very highest types that ever existed in that division of the vegetable world.

Again, we derive not, from this ancient *flora*, any proof that monocotyledonous plants preceded the dicotyledonous; for fragments of pine-trees are found among some of the older Carboniferous rocks. Still less have we any proof that monocotyledonous plants were, in progress of ages, transformed into dicotyledonous. On the contrary, we believe, on good analogy, that the two great divisions of the vegetable world, after they were called into being, went on, side by side, on two separate organic lines; the numerical proportions between the two depending, during all epochs, upon physical conditions. In some of our present tropical forests we have a great preponderance of monocotyledonous trees;

while, in climates like our own, all the forest-trees are dicotyledonous. Should we then conclude that the present tropical forests are both of a lower organic type, and of an older date, than those of our own climate? We know that such a conclusion would be false. Why then should we venture to affirm a similar conclusion while we are reasoning on the Carboniferous *flora?* Analogy, our best guide while we are deprived of any other, rather tells us, that the numerical proportions among the organic types of the Carboniferous *flora* depended not on the time that had elapsed after the several species had come into being, but on the physical conditions under which they flourished.

But great injustice is sometimes done to the rank of the Carboniferous *flora* while we are comparing it with that of the living world. The ancient *flora* is but a mere fragment of an organic series produced during one almost unvaried set of conditions; while the present *flora* consists of species, counted by tens of thousands. and derived from every condition of climate, from the arctic to the tropical, compatible with vegetable life. No wonder, then, that the present *flora* should seem to lord it over the older, and give an appearance of inferiority to the ancient types, which belongs not to their collective nature because they are ancient; but depends, more probably, on the conditions under which they grew, and on the mutilated state in which we find their scattered fragments.

Conclusion.—In this section of the Preface I have endeavoured to shew in what manner geologists try to clear their way among the broken fragments of a former world. They examine these fragments one by one, and learn to arrange them, in the exact order of their history: and taking the analogies of living nature as their clew through the dark labyrinths of the earth, they do their best to interpret the past by help of the present—what is dark by what is light—what is unknown by what is known. They are not anxious to form any theory: and if as a matter of speculation they do construct a theory, they profess to base it on allowed facts, and not on vague assumptions, which the progress of knowledge may prove to be untrue; and at every moment of their progress they are ready either to modify it, or to abandon it altogether, as new phenomena rise up before them.

First Forms of Vegetable and Animal Life as described in "The Vestiges," &c.

Let us now cast an eye over the shorter method by which the Author of *The Vestiges* professes to give colour to his hypothesis, and to bring the successive organic types, whether animal or vegetable, into a seeming accordance with it. I wish not to misrepresent him, and I should gain nothing by the attempt.

First, he supposes that the humble vegetable types of the sea were the oldest of their Class. This conclusion may be true; but, as we have seen, it rests not on good direct evidence.

Secondly, he supposes the vegetable types to have undergone a gradual transmutation, during a long lapse of ages—to have come out from the sea, and to have been spread over the dry land under modified organic forms. Of this derivation of our earliest land-plants we have no proof. Its assumption is nothing better than a begging of the whole question in debate; and it is both gratuitous and unnecessary to the hypothesis of development. It certainly accords not with any phenomena of our living *flora*. We have innumerable opportunities on our own coasts of testing the truth of this rash hypothesis. We find marine and land-plants growing side by side. In a few years the sea gains upon the land, and marine plants now grow where only land-plants grew before. In other cases the sea retires, and we now find land-plants where before we only found either marsh-plants, or those that were purely marine. But who, that is in his senses, refers such changes to specific transmutations? Or who that has seen marine and land-plants struggling side by side, as they have done for centuries, under conditions unfavourable to both, will dare to tell us that one set gradually gets the mastery by specifically transforming and naturalizing the other*?

Thirdly, he assumes that monocotyledonous plants passed by gradual transmutation into dicotyledonous—that the Carboniferous *flora* was of an humble and imperfect type—and that its antiquity and inferiority is proved by the excess of its monocotyledonous types. Of this part of the scheme we may affirm that it is defective in the statement of fact and erroneous in inference; and it derives no probability from the succession of organic types in our older strata. The succession of vegetable types is, however, so broken and imperfect as to be of comparatively small value to the argument. Most of our Palæozoic rocks are marine; and among them, as before stated, we have no right to look for, nor do we find, any thing like a continued sequence of such plants as might have grown contemporaneously on the land. If there be any show of probability in the application of our Author's scheme to the Palæozoic epochs, it must be derived analogically from some different source. The theory is not shadowed forth among the vegetable phenomena of the Secondary or Tertiary rocks; and I know not of any source of good evidence, bearing upon the question, beyond that which flows from the vegetable kingdoms of the present world.

---

* See Supplement to the Appendix No. IV. and No. VI.

Let us next glance at our Author's method of interpreting the history of the animal kingdom, from succession of organic types among our oldest Palæozoic strata. In the first four editions of *The Vestiges* he stated, without any reserve, that the animals of the old world appeared, among the successive strata, in a natural ascending organic scale; and what he asserted then he now only insinuates. "The first animals, (as he tells us, *Vestiges*, 6th Ed. p. 52), we are called on to notice, are *Polyparia*"—the creatures producing coral-reefs. Next he notices *Graptolites;* and then *Crinoïdia.* Now Graptolites do appear at the base of our known organic series; but the *Polyparia* which produce coral-reefs do not; neither do *Crinoïdia.* When he afterwards adds, that these latter animals *may* hereafter be discovered in the place he has given them, he writes in the language of theory, and not of chronological history.—"Of the *Articulata* we have," (he says, p. 54), "first a few examples of its lowest class, the *Anellides* or sea-worms;" and he quotes the well-known case of the Lampeter species. These Lampeter *Anellides* are undoubtedly of great antiquity; but they belong not to a low type of *Anellides*, but to the highest type of their class; and there are found in Wales other creatures of far higher organization, such as *Trilobites*, and *Cephalopods*, several thousand feet below them*.

He adds, "that Trilobites stand low in the Crustacea; nor were there any higher animals of the order (such as crabs and lobsters) yet in existence." I have never seen Crabs among the fossils of the great Cambro-Silurian groups; but the gentlemen of the Government Survey tell me that they have.

He then notices the *Brachiopoda*, *Pteropoda*, *Gasteropoda*, and *Cephalopoda*, in their natural order on an organic scale; and he reasons on this order as if it were historically true. A Brachiopod (*Lingula*) is one of our oldest known Mollusks; but it occurs, as stated above, along with the *Tellinomya*, which is a Lamellibranch; and the Cephalopods are found quite as low as, and I believe much lower than, the Pteropoda. —Lastly, he tells us "that during the lower Silurian era, there was as yet no fish nor any other kind of vertebrated animal, nor any creature which lived on dry land."...Giving him all the benefit of these assertions, (which it would be very hard to establish on mere negative evidence), I reply, that we have no right to expect land-animals, or even fishes, among the fossils of a very deep sea: and that *fishes of the very highest organic type are found near the upper limit of our older Palæozoic groups.* When facts are told historically, what becomes of the theory of development? Be it true or false, it is not suggested by Geology; and we can see no signs "of the comparative newness of life" among these most ancient fossils[*].

---

* In the frontier chain of Scotland I found sixteen species of *Graptolites*. Four of them are new; the others (with one exception) are described by Hall (Palæontology of New York) from the Utica slate. These *Graptolites* of Scotland are associated with *Anellides*; and they are, beyond doubt, of great antiquity, and perhaps not far from the parallel of the Lampeter fossils. They are, I think, not so old as the *Graptolites* found in the Skiddaw slate. (*Supra*, note p. 59.) The species have been carefully determined by Mr M'Coy; and the specimens in the Cambridge Museum prove, beyond any doubt, that *Graptolites* belong to the Order of *Hydroida*, as was first asserted by Neilson.

Passing on to the Devonian Fishes (Placoids and Ganoids), he tells us, "that they are manifestly inferior to the two other Orders—Ctenoids and Cycloids—which afterwards came into existence" (p. 64). What is so manifest to the Author is not true to nature. The reader has some of the evidence before him[†]. The very highest families of Sharks, and Ganoids of the noblest type and close upon the Class of Reptiles, are found among the Devonian Fishes.—It is not true that all these Ganoids have their backbones imperfectly represented by a continuous cartilaginous chord. Some of them at least (and perhaps most of them) had as true vertebral joints as any living Fishes; and they do not all conform to the embryonic type of

---

[*] Supplement to the Appendix, No. V.

[†] Note *supra* p. 64, and Supplement to the Appendix, No III.

hard-boned Fishes. It is not true that in all the Fishes, without exception, which have been found in the strata of the Palæozoic period, the caudal fin is truly *heterocercal*, (p. 66). And were this true, it would only prove the worthlessness of any attempt to arrange the organic rank of Placoids and Ganoids by an appeal to the embryonic tails of the Fishes of another Order*.

Finally, we are taught (p. 69)—"that, overlooking possible exceptions of a very dubious and narrow kind, we meet with no traces of land-plants" during the Devonian period.—I must state in reply, that the exceptions are neither dubious nor small in number—that land-plants are found among the Devonian deposits of our Island,—and that among the rocks of that age in the Rhenish provinces, such plants are numerous.

If the reader believe the previous statements, and I wish not to deceive him, he will at once see how widely different is the history given in the unerring book of nature from the fabulous narrative in some written records of creation.

Leaving what we may call the Author's historical narrative, let us next examine his more general views on the origin of animated nature. Bearing on this subject, I will first quote a very characteristic passage from his *Explanations* (p. 151): "In an arbitrary system," (meaning by these words any system that does not imply the theory of development), "we have scarcely any reason to expect mammals after reptiles; yet in this order they come. The Edinburgh Reviewer speaks of animals as coming in adaptation to conditions; but this is only true in a limited sense. The groves which formed the coal-beds might have been a fitting habitation for reptiles, birds, and mammals, as such groves are at the present day; yet we see none of the last of these classes, and hardly any trace of the two first, in that period of the earth. Where the iguanodon lived, the elephant might have lived: but there was no elephant at that time. The sea of the Lower Silurian era was capable of supporting fish; but no fish existed. It hence forcibly appears *that the theatres of life must have lain unserviceable, or in the possession of a tenantry inferior to what might have enjoyed them, for many ages.* There surely would have been no such waste allowed in a System where Omnipotence was working upon a plan of minute attention to specialities." I have not time to point out the bad logic, the unwarranted assertions, and the positive mistakes of this passage: but I may return to the concluding sentence, which is mischievous and irreverent.

---

* I know that my opinion is of little value, but I have often wished certain strange monsters, such as the Pterichthys and Coccosteus, to be taken from the other Ganoids, and placed in some natural Order by themselves. This has been done (and in no compliance with any suggestion of mine) by Mr M'Coy, who arranges these and kindred Genera in his Order *Placodermata* (*An. Nat. Hist.* 1846.) Some of them, at least, have as perfect vertebræ as any fishes: and as we find the noblest Ganoids running towards the Lacertian type; so these singular fishes, cased in an exoskeleton of great osseous plates, may perhaps be found to range toward the type of the Chelonians. Be this as it may, they certainly link not on, as was at first conjectured, to the *Articulata*.

In the same spirit he writes in the last edition of *The Vestiges*, (p. 159—168): but my limits compel me to abridge the extracts from this work. "Organic beings came not at once, as they might have been expected to do if produced by some special act on part of the Deity .... They came in a long succession in the order of progressive organization." What might have been expected I profess not to tell: but if we are to trust our senses they did not follow in such an order as to suggest a natural derivation, one from another. Again, "At the beginning of geological investigation it was thought that some intermediate external conditions ruled the appearance of particular classes of animals at particular times .... But it is now seen that the progress of the animal world was in its main features independent of such circumstances." We may ask in reply, By whom has this been seen? Not by the geologists who are now doing the best service in the field. They, every day, see more and more proofs of the modifying influence of conditions; and some of them deny that there are *any* features of animal progress which are independent of conditions. He then tells us, "It was a dream of the dawn of true geology that fresh creations of animals were connected with great physical revolutions of the surface .... but this idea is likewise passing away. .... In short, it is becoming more and more clear that organic progress depended not by any means wholly or immediately upon external circumstances, but in a great part upon time." (p. 161.) What the Author means by the "dawn of geology," I profess not well to understand: but I affirm it as certain truth, that the greatest changes of organic types among our strata *are* connected with *physical revolutions;* and that it is by a change of conditions, and not, properly speaking, by a lapse of time, that we can rationally interpret the organic sequence of the old world. "All this," the Author adds, "looks unlike either special working or special willing on the part of the Creator." Having given us a history of nature, not warranted by fact, he then tells us this history is inconsistent with the idea of any exercise of a Providential and Creative will. I shall return to this last inference in another part of the Preface: my present business is with our Author's history, and the physical theory he pretends to found upon it.

How he is to reconcile all the previous extracts to the expression of his more general views, I profess not to understand. Thus, he tells us, (p. 154), "that life, as it were, *pressed in* whenever and wherever there were suitable conditions:" yet within a few pages he tells us, as we have seen, that the phenomena of organic development "depended comparatively little upon conditions, but in a great part upon time." Again, he teaches us, "that the oolitic continents, where only reptiles roamed, could equally have supported mammalia . . . . yet mammalia came not." (p. 161.) Now had these unqualified statements been true, Mammals ought, on his own principles, to have been developed in great abundance before the end of the Oolitic and Cretaceous periods: for Mammals *did* come into being during the deposit of the Stonesfield slate, not far from the base of the great Oolitic group; and this at least is true, that not so much as one fragment of a terrestrial Mammal's bone has yet been discovered in the higher parts of the Oolites, the Wealden beds, or the Chalk.

But *after* the period of the Chalk, and in the lowest division of the great Tertiary series, terrestrial Mammals appeared again; and in a comparatively short lapse of time, so far as we can judge from the evidence, they multiplied in Genera and Species, and flourished in great abundance. Such facts seem to prove (whether the transmutation scheme be true or false), that conditions, far more than time, have in all ages influenced the progression of animal types.

I will give the reader another example of the Author's logical skill; and it exhibits one of those cases of plausible, verbal sophistry, which have so often cheated men, ill acquainted with facts, into unwarrantable conclusions. After informing us "that (while we are examining the successive deposits of geology) the total mass of animal creation puts on, more and more, the appearance which it now bears,"—he proceeds to ask us, "if this does not seem to imply that the present system of things is essentially connected with the past; in which case, if the present is a natural system, we have an additional proof that the past was a natural system also?" (p. 162.) No one has ever denied that the whole geological sequence presents a series of true historical monuments. We believe that the successive deposits, of all periods, were formed by natural means; and that the animals entombed within them performed all the functions of life as animals perform them now, and that they flourished under conditions which were in fit accordance with their organic structure. But the words, *natural system*, have two very different meanings in the previous extract. In the first instance, they only mean that natural sequence of organic life which is going on before our eyes from one generation to another: but in their second use they are meant to imply that the animal types of one geological period produced (in the way of natural generation) the *new animal types* of the next period; and so on, in a regularly ascending order, till we reach the present system of nature, in which species do not change. In other words, that mollusks produced fishes, that fishes generated reptiles, that reptiles generated birds, that birds became mammals, and that monkeys (the highest type of old mammals) became the natural parents of the human family. By a slippery use of the words, *natural system*, the Author imposes on the careless reader, and perhaps imposes on himself. If this pedigree be true, we may well ask, as Cuvier did nearly forty years since, *pourquoi les entrailles de la terre n'ont-elles point conservé les monumens d'une généalogie si curieuse?* He found no traces of it among the rocks above the Chalk; and since his time geologists have spared no pains to discover and interpret the oldest records of creation; and, so far as they have read them, they find not one leaf of this monstrous genealogy; nor is its possible existence suggested by any hint which they have derived from their ancient documents. Here I conclude my remarks on the organic series of the Palæozoic rocks, so far as it bears on the theory of development.

§ 6. *Fossils of the Secondary Division, &c.*

While we ascend from the Palæozoic (or Primary) to the lowest Secondary groups, we continually meet with proofs of great internal movements and altered physical conditions. Beds piled on one another, and sometimes in a discordant position—great heaps of conglomerate—abraded fragments ground down into beds of sandstone, marl, and mud, generally of a deep red colour—these are the physical monuments of the period; and they may be traced through the European Continent, and the British Isles, and (with some change of mineral type) through wide tracts of North America. Volcanic action on a vast scale may, perhaps, have supplied the materials whereby the sea in many places became of a deep red colour; and whereby the older types of marine organic life were, through many regions, utterly destroyed. Trees, however, flourished during this time upon the land, and were sometimes washed down into the sea and saved from entire destruction; for we, here and there, find their petrified trunks among these red deposits. Tortoises, gigantic Batrachians, and other strange Reptiles, were, during this tumultuous period, crawling near the margin of the sea; for we sometimes (though rarely) find their bones, but more frequently the marks of their footsteps, on strata deposited at this period between the high- and low-water level.

The whole series of the deposits above noticed is called *Trias*, and has been divided, by the geologists of Germany, into three groups—the *Bunter-sandstein*, the *Muschel-kalk*, and the *Keuper*—which are followed in a regular ascending order by the Oolitic series and the Chalk. The middle group of the three (*Muschel-kalk*) abounds in fossils; and it gives us one good marine fauna between the Palæozoic rocks and the Lias which forms the base of the Oolites.

Unfortunately this middle group is not found in the British Isles. Its absence may, I think, be explained by the fact, that all those parts of the sea, out of which in after times rose up our Island, were turbid and deeply tinged by the continued agency of volcanic fires: and that great changes of level did take place at this time, is proved by the fact, that the upper part of the New red-sandstone of England is not unusually deposited on the broken edges of the upheaved red beds which we find below them. Be this explanation right or wrong, the sea was for a time less turbid in that part of the world where we now find central Germany and an adjacent part of France, and the contemporaneous deposits were of a more ordinary colour: and in conformity with these conditions there flourished the noble marine fauna of the *Muschel-kalk*. But this fauna was in its turn destroyed—the sea again became red and turbid; and the *Keuper* of France and Germany became physically identical with those beds of our New red-sandstone which form the top of the whole series here described, and are packed immediately under the Lias beds and Oolites.

The fossils of the *Muschel-kalk* give us therefore the first distinct organic step among the marine deposits, after we leave the Palæozoic rocks, and begin our ascent among those of the great Secondary division. What then are the organic types we find in this *fauna* of the *Muschel-kalk?* I will answer this question in the words of the Edinburgh Reviewer: "We do not here find so much as one single species with which we are familiar in the Palæozoic series. All the older Families and Orders have disappeared, and even the Saurians differ in Order from those of the preceding epoch. It is not too much to say that nature has destroyed all her old moulds of workmanship, and begun a new work on a different plan. Yet is there (in those parts of the world where we find the *Muschel-kalk*) no break or interruption in the regular sequence of deposits. We accept these facts of nature as we find them. The physical conditions of the earth were changed, and Creative Wisdom called into new being organic structures to suit the change. With this we are content; and we defy any man living, whatever may be his knowledge, to prove that in these steps of the great ascending series 'the stages of advance were very small'—'only a new stage in the progress of gestation, an event simply natural'—'a development from species to species,'—'phenomena of a simple and a modest character!' Assertions more opposed to the works of ancient nature were never before recorded in the written language of a gratuitous hypothesis *."

---

* See *Edinburgh Review*, No. CLXV. p. 52; and *Vestiges*, &c. 3rd Edition, p. 231.

I entreat the academic readers, to whom the following Discourse is more immediately addressed, to examine for themselves, in the cabinets of the Woodwardian Museum, (thanks to Mr M'Coy, now in excellent arrangement,) the organic sequence of the Primary and Secondary series; and they will there see good evidence for these strong affirmations of the Reviewer; to which, indeed, nothing has been opposed but vague hypotheses. It may perhaps be urged, that the intervening and connecting types might have existed in some remote seas from which they passed by migration to that part of the ocean out of which central Germany was elevated in after times: but we have neither positive facts nor probable presumption for the hypothesis: for there is neither gradation nor mingling of Species, so far as we know, between the newer Palæozoic types and those of the *Muschel-kalk:* nor are there in those parts of Germany and France where we find the *Muschel-kalk* any indications of break or interruption among the deposits which might suggest to the mind a notion that some great links of the organic chain have been lost. Again, certain organic families (for example Orthoceratites) are found, in a few rare instances (for example, among the Alps), straggling beyond their ordinary bounds into the lower parts of the Secondary groups: but they shew no deviation from their normal structure, nor any passage towards the known Secondary types of *Brachiopoda.* They offer no argument for the theory of development: but they do seem to shew, that in all cases, both the beginning and the end of organic families depended rather ther. physical conditions than upon time*.

Lastly, it might perhaps be urged, that allowing nature to have broken her ancient moulds of workmanship when she commenced with the fauna of the *Muschel-kalk*, we have a right to suppose that she began her work afresh, and completed it in the way of natural development. If so, we ought to see some traces of this mode of working among the successive beds;—but we find no such trace; for the fossils of the group are not produced, one above the other, in the approximate order of any conceivable organic scale. Well may we again (in the words of Cuvier) ask those who affirm the theory of development, "*Pourquoi les entrailles de la terre n'ont elles point conservé les monumens d'une généalogie si curieuse?*"

After we have ascended from the *Muschel-kalk* to the Lias we find ourselves in a new fauna. The great series of fossils derived from the two formations are seen, side by side, in our Museum, and do not interchange so much as one single species. It is, however, true, that there is what might, in popular language, be called a family-likeness between the two faunas; and the fossils of the *Muschel-kalk* are much nearer to the organic types the Lias than they are to the types of the newest Palæozoic rocks. Still there is a great organic interval between the two fossil groups. which no theory of natural development can explain, without some new intervention of hypothesis. And the same difficulties meet us again and again as we ascend, step by step, through the several deposits till we have reached the upper limits of the Chalk where the Secondary deposits end. The facts of Geology supply us therefore with a great cumulative argument against the theory of development. But I must forbear. Were I to describe the successive Secondary groups, and attempt to enumerate their most characteristic fossils, this Preface must change its form, and become a treatise of Geology. This, at least, I may affirm, that the phenomena, when considered in detail, do not suggest the theory of development.

---

* We have many examples of this fact among the Secondary groups. For example—Some most characteristic fossils of the Oxford clay are cut off by the coral-reefs and stone-beds of the middle Oolite, and do not reappear in the overlying Kimmeridge clay. But in other places, where the reefs are wanting, and the ancient bottom of the sea presents a continuous series of similar conditions, the characteristic fossils of the Oxford clay rise up into the Kimmeridge clay, and there abound along with fossils characteristic of the upper formation.

Let me, however, crave the reader's patience while I give a short synopsis of the facts which bear on the historical development of the four highest Classes of the animal kingdom to the end of the Secondary period: viz. Fishes, Reptiles, Birds, and Mammals.

Fishes.—It appears that the very oldest fossil-fishes of which we find traces among the Palæozoic strata, are of a very high organic type; and that in not one of them is there the remotest proof (as was once supposed) of such near affinities to Crustaceans or any other Articulata, as to imply a natural passage from one Class to the other: and the same might be said of all other organic types below the Class of Fishes. The several Classes are as abruptly defined as they are in the living world, and do not graduate one into another. These ancient Fishes have therefore no true organic base to rest upon; and there are no anterior forms of nature, brought to light by geologists, from which we can suppose them, even on the theory of development, to have sprung in the way of natural generation.

Again, the Fishes of the Secondary period are eminently characteristic; and distinct species are found in nearly all the subdivisions of the whole series from the bottom of the Lias to the top of the Chalk. "Even allowing (for the sake of argument) the change of Species by development, the supposition will not help us; for we shall afterwards be compelled, on this hypothesis, to ask for many sudden changes from Family to Family, and from Order to Order. And surely this would be thought a little too much for 'the simple and modest advances' of nature*." Those who wish to follow out this subject may consult the *Poissons Fossiles* of Agassiz, and especially his historical scheme of development given in his first volume (p. 170). All the Fossil-Fishes, described in that great work, till we reach the base of the Cretaceous groups, are either Placoids or Ganoids: and they are divided into Families, Genera, and Species. Some of the Families begin from the earliest times, and still survive (though after many changes of specific type) in our present seas. Others flourish and expand during one or more periods, and then decay. Several Families, after playing an important part in the past history of nature, disappear altogether on the ascending scale, and are seen no more. But in this great scheme, which places before the eyes the true historical progress of nature, there is no confusion of family types, nor any obliteration of the organic intervals between them.

---

* *Edinburgh Review*, p. 53.

One more quotation will complete all that I need state on the present question. "Let us next come to the Cretaceous system, and analyse the phenomena in the same manner. This deposit indicates a great change in the physical condition of the old sea; and, in accordance with this fact, we also find a great change in many of the organic types. It is here that we have the first traces of animal species still living, and they belong to *Infusoria;* but all (or very nearly all) the nobler organic forms of the Chalk are of extinct Genera or Species. But we will confine ourselves to fossil Fishes. (1) We find four Families which, commencing among some of the older systems, pass into the Chalk, (with changes of generic and specific type;) and afterwards (with corresponding changes) pass into our present seas. Two of these Families (Squalus and Ray) go on continually increasing as we ascend. (2) The two Orders of *Cycloids* and *Ctenoids* now make their appearance for the *first time*, in not less than *eighteen goodly Families!* They are separated by a wide organic interval from all the older Families and Orders; and they are the Fishes with which we are now most familiar among the living forms of nature. All these eighteen Families (but with various generic or specific changes) pass through the Tertiary period into the modern seas; and, in addition, there are a few Families which began during the Tertiary periods, and are still living in our own times. How are we to account for all this on any theory of development, which gives us only 'a simple and modest' change from one species to another? Allowing, for the sake of argument, the possibility of specific changes in a *Genus* of *one Family*—how are we to account for the sudden appearance of two new *Orders* and eighteen new *Families?* The facts of nature are in direct antagonism with the theory. They crush it to atoms." (*E. R.* p. 55.)

At the end of his great work, and after a philosophical survey of the whole history of fossil Fishes, which he had studied in the book of nature, from the oldest chapter to the newest, M. Agassiz deliberately records his opinion of the theory of development in the following words: "*Il faut nécessairement remonter à une cause plus élevée, et reconnoître des influences plus puissantes, exerçant sur la nature entière une action plus directe, si l'on ne veut pas se mouvoir éternellement dans un cercle vicieux. Quant à moi, j'ai la conviction que les espèces ont été créés successivement à differentes reprises; ..... et que les changemens qu'elles ont subis durant une époque géologique ne sont que très secondaires, et ne tiennent qu'à leur plus ou moins grande fécondité, et à des migrations subordonnées à des influences de l'époque.*"

Reptiles.—Within the last three or four years, one or two obscure, but undoubted fragments of Reptile skeletons, have been discovered among the old Carboniferous strata of Europe and America: but no traces of such fossils have yet been found among the Carboniferous rocks of the British Isles, notwithstanding the enormous excavations which are daily carried on among them. Three Genera of Reptiles—the Thecodonts, the Palæosaurs, and the (so-called) Monitors of Thuringia—are found in the (*Permian*) group of rocks which overlies the Carboniferous system, and forms the highest limits of the Palæozoic Division. These three Genera belong to the Lacertilian Order of Owen, and are therefore of a high organic type.

Ascending next to the base of the Secondary series (represented in England by the New red-sandstone and saliferous marls; and more perfectly on the Continent by the *Triassic* system) we find within it many traces of the Reptile Class. Among them are Chelonians and gigantic Batrachians. The Rhynchosaur and the Dicynodon appear, on the best evidence we possess, to have belonged to this period. The former is like a Chelonian in having mandibles without teeth; but in its general bony structure it is a true Lacertian. The latter has two large tusks (like those of a Walrus) fixed in its upper jaw; but its cranium and skeleton are of the true Saurian type.

Other organic remains belonging to this period have, no doubt, escaped notice; but in addition to the traces above mentioned, I may add—that numerous Reptiles left their foot-prints, which are still seen on the muddy and sandy beds that were formed on the ancient shores; and imperfect as the evidence is, it justifies us in drawing the conclusion—that during the period of the New red-sandstone many cold-blooded monsters were crawling on the land, and on the shores of the ancient estuaries.

During the epoch of the *Muschel-kalk* (the middle division of the *Triassic* system) Enaliosaurs seem to have abounded. They are of a low organic type, and were incapable of walking on dry land: and of all known Reptiles they make the nearest approach to Fishes. New Genera of the same reptilian Order swarmed in the seas during the epoch of the Lias and the Oolites, and disappeared, so far as we have evidence, near the base of the Chalk. Side by side with these Reptilians of a more humble type flourished Crocodilians and other Reptiles of a very high organic grade; and contemporaneously with these flourished also Reptilian Orders (such as Pterodactyls and Dinosaurs), to which we find no analogous types in the living world.—The Pterodactyls, as the name implies, were true Reptiles with membraneous wings, like those of a bat.—The Dinosaurs were creatures of gigantic stature, with marrow-bones and ponderous muscular limbs like those of Pachyderms, and exhibited, in their collective anatomical characters, the noblest forms of Reptile life that ever were created: yet they all seem to have perished before the period of the Chalk. Lastly, the collective Saurian fauna of the Chalk is of an inferior grade to the corresponding fauna of the Oolitic series.

On a review of all these facts we may affirm, that several Genera of Reptiles were called into being near the end of the Palæozoic period—that three of these Genera (at the least) were of a high organic type—that new Genera and new Orders were successively added till the Saurian Class reached its most perfect development—and that it afterwards underwent a decline before the end of the Secondary period, both in the number of its Orders and in the grade of its highest organic types. Facts such as these throw no difficulties in our way, while we see, during every step we take in the natural world, the marks of Creative Intelligence. They simply tell us that successive organic types were adapted to successive conditions of the earth: but they are at open war with the theory of development; which refers all these organic changes to mere material causes—affirms them to be *progressive*—and to have been brought about not so much by a change of conditions as by a long lapse of time.

What was the earliest form of Reptile life? The true answer to such a question may, from the nature of the evidence, for ever remain in doubt. Within the last four years the grounds of evidence have shifted, and may shift again. But I will, merely for the sake of argument, assume it as a fact proved, that the first Reptiles were Enaliosaurians. Could, then, the humblest type of these animals spring, in the way of natural generation, from Fishes? Professor Owen gives to this question a negative reply. It is a subject on which he is better informed than any living physiologist; and he tells us, "that through no known forms of fossil animals can we diminish the wide interval which divides the Sauroid Fishes from the Ichthyosaurus." As the subject is one of vital import to the theory of development, I have also consulted M. Agassiz (whose labours in the anatomical examination of fossil Fishes are so well known) on the answer we must give to the previous question, and his reply is now before me. He considers the Ichthyosaurus as the best generic Reptilian type to bring into near comparison with Fishes, and concludes in the following words: "*Enfin, y a-t-il quelques raisons de considérer les Icthyosaures comme des descendans des poissons Saurides antérieurs à l'apparition de ces reptiles? Pas la moindre. Je considererais même tout naturaliste, qui poseroit au sérieux cette question, comme incapable de la discuter et de la juger. Il se mettroit en dehors de toute réalité, et raisonneroit seulement sur une base de sa création et non point par induction.*" After this reply I will not insult the reader by asking him whether the three or four Genera of Lacertilians in the Magnesian Limestone can be considered as the immediate progeny of Sauroid Fishes.

Secondly, can we give any colour of truth to the theory of transmutation by taking many independent lines of organic ascent from the first humble types? By assuming the truth of this hypothesis we gain nothing for the theory; for it helps us not towards any true historical development of the animal kingdom. If we take a thousand lines of assumed organic ascent from the primeval types, and suppose the changing forms on each line to be brought about in the way of natural generation, we must further suppose that the organic changes on this ascending linear scale are made by "modest steps"—by the gradual sliding of one species into another. Without some such conception as this we cannot give the similitude of natural truth to *our hypothesis*. Now if this genealogy be true, we ought to find some traces of it among nature's works: but we look for it in vain; and at every turn we may ask, in the words of Cuvier, "*pourquoi les entrailles de la terre n'ont elles point conservé les monumens d'une généalogie si curieuse?*" Taking the whole aggregate of fossil Species and grouping them chronologically, we cannot construct out of them so much as one single ascending organic line without such breaks of continuity as are in deadly antagonism with the theory of development. If we begin with some of the best marked families of *Radiata*, we find them arranged on no organic scale that is chronological. The same remark applies to many of the *Articulata* and *Mollusca*; and the same negative fact is still more impressively brought before us in the Class of Fishes.

But to return to the Reptiles. We find not the ancient Genera and Species in any true order of natural development; and looking at the whole collective Class during the Secondary period, it is, as we have seen, at one time progressive and afterwards retrogressive: and if we descend to the consideration of single lines of supposed organic ascent, (such, for example, as the Enaliosaurian,) we are no nearer to the assumed hypothesis. So far as our present evidence goes we find the type of the Plesiosaur preceding that of the Ichthyosaur: yet the Ichthyosaur is on a lower organic grade than the Plesiosaur. Again, if we take the Batrachian line, and suppose it derived from Fishes by a natural law of transmutation, we may ask—Are the oldest known *Batrachians* of a lower and more fish-like type than our living frogs or toads? I believe the contrary.

The oldest known Batrachians are not, as Owen tells us, "elevated Fishes, but degraded Crocodiles." But I must forbear; as all illustrations that depend for their value upon details, are unfit for this Preface.

Thirdly, it may be asked, Can we not account for the varying organic forms of the old world, by a lateral expansion of our ascending lines—thereby breaking down the boundaries between Genera and Orders, and gradually producing an apparent confusion in the arrangement of the successive animal types? We reply, that there is no confusion in nature to justify the rash hypothesis this question implies. The Orders and Genera of the fossil Reptiles are quite as sharply defined as they are among the Reptiles of the living world; and there is no confusion in their organic types. To derive hypothetically one Reptile Order, or one Genus, from another, might prove a man disqualified to discuss or pass a judgment on any question in physiology; but could prove nothing else. The hypothesis would have no resting-place in nature; and would involve an absurdity not less than that of pretending to breed a rabbit from a rhinoceros, or a hog from a hippopotamus.

Birds.—All the supposed traces of Birds among the Palæozoic rocks have so far turned out to be apocryphal: but impressions of the footsteps of animals of this Class abound in some parts of North America, among rocks of the age of our New red-sandstone; and the most remarkable and abundant Species seem to have been *Struthionidæ* and *Grallæ*. According to the development theory, the Class ought to have started with the aquatic and natatorial families; but the evidence, if we are to square our theory with facts, rather points to a contrary conclusion. A very few obscure fragments of the skeletons of Birds appear among the Oolitic groups; and, lastly, one or two well-marked bones of aquatic Birds have been found in the Chalk.—Such is the meagre evidence we derive from Birds during the long Secondary period—assuredly of little value for any theory, and far too broken and imperfect to tell us the exact epoch when this Class came into being, or the manner in which the Genera were gradually developed. Their existence is, however, a fact; and, how are we to account for it? According to the theory of development, they must have sprung from some preceding vertebrate type in the way of natural generation: but not the shadow of any proof has been given in support of this genealogy. By none of the ancient forms of organic life has the wide interval between Fishes, Reptiles, and Birds, been so interpolated as to place the boundaries between them in any doubt. These boundaries are as plain in the ancient as in the living world: and while we assert that Birds sprang from Reptiles or from Fishes, we assume a fact that violates the whole economy of nature, is at open war with all the analogies of the living world, and of which Geology gives us not one scrap of evidence. And thus, while we pretend to base our hypothesis on the evidence of Geology, we explain away that evidence by the mere assumption of our hypothesis. The ends of inductive truth can never be advanced by such a wretched abuse of reasoning.—Let it not be said in reply, that we find winged Reptiles among the Secondary rocks. In the present condition of our knowledge we have as good a proof that Pterodactyls came into being after Birds, as we have that Birds came into being after certain Genera of Reptiles: and were it now proved that Pterodactyls preceded Birds, the theory would not advance one step; for these winged Reptiles shew no near organic affinities with Birds. Their most important organic affinities point in a different direction. Taking, therefore, known facts and analogies for our guide, we affirm that the earliest Birds of the old world have no natural zoological base to rest upon.

How then were Birds called into being? We reply, that they were created. The word expresses the exact condition of our knowledge. It assumes the existence of an Intelligent Power in nature acting with prospective wisdom; and it tacitly affirms, as a negative fact, that we comprehend not the manner in which this form of organic life began. It was exactly by like reasoning from the Class of Fishes that Agassiz arrived at a similar conclusion. He was wearied by an eternal movement in a vicious circle, and was content to express his knowledge in modest terms, which rightly defined its boundaries; and he did not blindly venture to soar higher still by casting down the steps whereby he had mounted so far, and by discarding all the analogies which had hitherto guided him to the conception of general truths.

Mammals.—The remains of no Mammals, either terrestrial or marine, have been yet found below the Oolitic system. In the lower part of the British Oolites (the Stonesfield slate), portions of the jaws of two Genera of Marsupials were long since discovered; and these are the oldest known Mammals. A single Cetacean bone (probably derived from the Kimmeridge clay) was found by myself, some years since, near Ely; and it is, I believe, a solitary example of a Mammal's bone from the upper Oolites. Lastly, the bone of no Mammal, either terrestrial or marine, has, so far as I know, been yet found in any part of the Cretaceous system. Such is our very meagre evidence respecting the early types of the Mammal Class. Two questions offer themselves for our consideration. (1st.) Does this evidence give us any proof of a supposed fact (assumed by the author of *The Vestiges*), that marine Mammals preceded the terrestrial? So far as the evidence goes it proves just the contrary. (2dly.) Can we derive, in the way of natural generation, the two Genera of Marsupials from any known anterior form of organic life? I willingly adopt the words of Agassiz (given by him in reply to a question not one jot more unreasonable): "*Je considérerois même tout naturaliste qui poseroit au sérieux cette question, comme incapable de la discuter et de la juger. Il se mettroit en dehors de toute réalité.*" One who has told us of hatching a rat from a goose's egg, may think it but a modest miracle to hatch a Stonesfield Marsupial from a Triassic Struthio—a Kangaroo from a Cassowary: till he has performed his first miracle we may well be allowed to doubt the second. I affirm, then, that the Stonesfield Marsupials are phenomena unexplained by the theory of development; that their genealogical line is broken; and that they have no true organic base to rest upon. Are we to talk of "modest steps" as we advance towards the theory of development, while at every moment we are taking immodest strides which carry us out of the bounds of the natural world? To make the theory probable we must seek for some evidence that widely differs from that which is offered by the organic forms of our Secondary series. At the very lowest estimate of all the evidence derived from the organic remains of the Secondary rocks, we may affirm that it suggests not to any sober mind the theory of development. The conclusion might be pushed much farther; but, for the present, I am content to leave it here.

§ 7. *Organic Remains of the Tertiary Division,* &c.

It now remains for me to notice the third and highest Division of our great geological deposits—including all groups of regular strata posterior to the Chalk, and anterior to the modern, or historic period. These deposits, which are of great aggregate thickness, and are extended over wide surfaces of all our Continents, admit of three primary subdivisions—Eocene—Miocene—and Pliocene: and these three names imply, that in the lowest subdivision (Eocene) we find only the dawn of living Species—that in the next subdivision, living Species, though more abundant than before, still form the minority—and, lastly, that in the upper subdivision (Pliocene) extinct Species decline in number, and living Species form the majority. In a certain sense this grouping is artificial, but it is based on observed facts; and since it was first published by Sir C. Lyell, has generally passed current among Geologists: and it now forms the basis of more complicated subdivisions, made necessary by the progress of discovery.

To describe these deposits is not my object; but I may add the following short notice of them.—(1) They were preceded by great continental movements and changes of marine level; from which it follows, that they are not, as a general rule, co-ordinate with the rocks on which they rest, or form any structural passage into them. (2) They generally seem to mark the commencement of new physical conditions. (3) They were elaborated during a long period of ages and during very different conditions of temperature. Thus, the fauna of the Eocene period invariably indicates a sub-tropical temperature; while the fauna of some of our upper Tertiary beds indicates a climate in temperature apparently below that of England. (4) The passage from one subdivision to another is not always gradual, but more frequently seems to mark some sudden change of conditions. (5) The upper Tertiary groups give us no well-defined links, whereby we may connect them with the deposits of the modern, or historic period in which we trace the works of man.

As we ascend from one Tertiary group to another we find little difficulty in the interpretation of nature's record: but when we attempt to rise still higher on the scale, so as to connect the past with the present, we meet with documents so mutilated, and written in characters so obscure, that we almost despair of interpreting them, so as to draw from them any true, connected history. While making this attempt, we encounter continual indications of shifting marine levels—we find marine terraces high upon our mountain-sides, and raised sea-beaches far above any modern coast-line—we find proofs of a long period when glaciers filled our high valleys, and when great masses of rock were drifted across the country on icebergs, and sometimes perched on our mountain-tops — and we find proofs of diluvial currents, which, descending from higher to lower levels, dragged with them enormous masses of gravel and superficial rubbish containing broken specimens of Mammal's bones and abraded fragments of all the older strata.—To rationalize and arrange in historical order phenomena such as these, is perhaps the hardest task that has yet been submitted to Geologists*.

Leaving then all questions that are strictly geological, I will next consider the organic phenomena of the Tertiary division; and I will commence my task with a long extract from the *Edinburgh Review*, because it gives a condensed account of some of the leading facts that bear on the true development of organic life; and, still more, because it has formed the subject of some comments to which I must reply.

---

* This task has been attempted in a great original Memoir by Professor E. Forbes, (*Memoirs of the Geological Survey of Great Britain*, Vol. I.) If he has not succeeded in clearing away all difficulties, and if some of his positions be considered doubtful, or untenable—it must, at least, be admitted, that he has brought, with no common skill, a vast mass of facts to bear upon the very difficult questions discussed, and that he has the undisputed honour of having taken the first firm steps towards a right conclusion.

"On the theory of development, 'the stages of advance are in all cases very small—from species to species,' and the phenomena, 'as shewn in the pages of geology, are always of a simple and modest character.' Let us test these assumptions by one single step from the Chalk to the London-clay, or any other Tertiary deposit. Among the millions of organic forms, from Corals up to Mammals, of the London and Paris basins, we find hardly so much as one single Secondary species. The humble *Infusoria* have been already noticed; and in the south of France it is said that two or three Secondary species straggle into the Tertiary system; but they form a rare, and almost evanescent exception to the general rule. Organic nature is once more on a new pattern—plants as well as animals are changed. It might seem as if we had been transported to a new planet; for neither in the arrangement of the Genera and Species, nor in their affinities with the types of an older world, is there the shadow of any approach to a regular plan of organic development. Our limits forbid us to enter on details, and in truth they are unnecessary; for if the chain of development be made of broken links, and if its first links were never bound to nature, (and we have proved already that they were not,) then must the last links inevitably want all semblance of material support. But to convey to our readers some notion of the *flora* and *fauna* of the oldest subdivision of this new period, we may tell them in a few words, that we find in it the remains of a noble *flora*—coniferous trees, palm-trees, and thousands of drifted seed-vessels of very many new Species, but all of a tropical or sub-tropical type. To these we may add more than a thousand Molluscs, all new, yet making an approach to the types of living nature; and with them are two or three modern Species. We find Crocodilians greatly differing from the Secondary types, and conforming to the modern, yet not specifically agreeing with them—Serpents approaching the great Boa—Tortoises and Turtles in great abundance, but of extinct Genera—Fishes of the same general structure with the newer Families of the Chalk, but of different Species, and along with them at least two Families of a new type—Birds of nearly all the living Families, but the Species probably different. And lastly, we find a noble series of Mammals—especially Pachyderms; but including Carnivora, Quadrumana, and other Orders. Among the Mammals described by Cuvier from this lowest division of the Tertiary system, all the species are of *extinct Genera*. Some exceptions to this rule may have been found since; but, at least, all are of extinct Species. These different Orders and Classes are not arranged on any ascending scale. Carnivora are as old as Pachyderms, so far at least as we have any evidence bearing on the question; and Quadrumana (monkeys) are found in this division—thus contradicting and stultifying the upper end of our Author's grand creative scale.

"As we ascend towards the middle divisions of the series, there is a development of nature's kingdom nearer and nearer to living types. But it is not a development after our Author's scheme. It follows the law of the rise, progress, and decline of the organic Families of the older world, already pointed out. We have no confusion of Genera and Species, and no shades of structure to make dim their outlines. In the great Tertiary basin of the Lower Rhine, we find, in a few small quarries near Mayence, more Vertebrate remains than have been found in the Paris and London basins. Many Genera and Species are new, and among them are old Species of Elephant and Rhinoceros. We seem to have taken one upward step towards the living world; but we have no confusion of Species. Again, a vast menagery of old Asiatic Mammals, and lower Vertebrates, (collected with vast labour, and in part also described by Falconer and Cautley,) are now in the British Museum. Some of the types are strange and new, and all of them shew the riches of these ancient kingdoms of nature. But not one of them (and the question has been battled out at Paris) offers the shadow of a proof of specific transmutation, or obliterates the clearness of nature's record. The documents of a newer date found among the British rocks are few and imperfect. We have already spoken of them, and we cannot follow the subject any further, as our narrow limits forbid it.

"Returning, then, to the lowest division of the Tertiary system, as seen in the London and Paris basins, and confining ourselves to the Pachyderms, we may ask—from what anterior forms of organic life are we to derive them by any possible law of common nature? The creatures of the older world, which made the nearest approach to Mammals, (excepting the Marsupials of the lower Oolites,) were the Dinosaurs; and they died away (if we are to trust Geology) ages before the end of the Chalk. These Mammals (and the same remark applies to all the other remains of the Class) have no zoological base to rest upon. They were therefore not called into being by any known law of nature, but by a power above nature. They were created by the hand of God, and adapted to the conditions of the period. This is the conclusion of Agassiz and Owen, on better evidence than Cuvier possessed: and this was in substance the grand conclusion of Cuvier; for if, as he again and again affirms, the extinct fossil Species which he reconstructed with admimirable skill, were not produced by any continued natural organic law from other Species, then must they have been created. His first proposition is this—*les espèces perdues ne sont pas des variétés des espèces vivantes.* But there are some, he tells us, *qui pensent qu'avec des siècles et des habitudes toutes les espèces pourraient se changer les unes dans les autres, ou résulter d'une seule d'entre elles.* And what is this but the theory of transmutation and development? But he replies—*pourquoi les entrailles de la terre n'ont-elles point con-*

*servé les monumens d'une généalogie si curieuse**? He wrote on the evidence before him, and it was enough. His conclusions were contested at every point. Ancient tombs were ransacked to obtain evidences of some change in the human type. Animals were dissected in cases where, by domestication and all the artifices of breeding, the varieties of Species had reached their widest limits. Hybrid monsters were produced by cross-breeding, (such are never produced in wild untamed nature;) but they were fruitless; or, (as is said in one or two cases,) after two descents, they returned to one of the first types. All the experiments and dissections were in vain—nature was true to her own work—and Species were found, in living nature, to be permanent. To this law not one exception has been found. But there are some good anatomists at Paris—misled, we believe, by false views respecting the grand zoological sequence of geology—who cling to the theory of development; and some of these hypothetical interpreters have presumed to scoff at these great conclusions, and to talk of *la clôture du siècle de Cuvier*. Such persons we would remind of the fable of the old lion, and leave them to make its application." (*Edinburgh Review*, p. 58—61.)

Such is the statement of the Reviewer: and what is the reply given by the Author of *The Vestiges*? "The more rational explanation (he tells us,) of the appearances is one suggested by actual facts observed in the strata, that the final cretaceous beds were deposited in seas more than usually deep, and which were therefore no proper habitat for the animals previously existing—that an interval of time afterwards took place, which is not represented by any strata which have been discovered—and that by the time the tertiary formation commenced, the usual modifying influences having never ceased, the fauna had undergone such an amount of change as naturalists are accustomed to describe (their language being wholly arbitrary) as a renewal of species*."

---

* "*Discours Préliminaire* to the *Ossemens Fossiles*; and the same sentiment is repeated more than once in the different dissertations in that great work."

This argument is made up of three distinct propositions; the first of which is not true: the second, at the very least, is doubtful; and the third is in the highest degree improbable and out of all co-ordination with what we observe in nature: and no seeming probability can be given to it except by begging the whole question in debate. The theory of development is not suggested or made probable by the phenomena of living nature: but, say the materialists, it is suggested and made probable by the facts of geology. In reply, we appeal to such facts as are given in the previous extract from the Review; and what is the rejoinder? That the whole change between the Secondary and Tertiary fauna had been brought about "by the usual modifying circumstances which had never ceased." The theory of development is proved (we are told) by the facts of Geology; and when we appeal to the facts of Geology as they are written in nature's book (the true records of creation), we are then told to interpolate and rationalize them by an audacious assumption of the very theory which is in discussion! Such a scheme of logic is no better than a cheat, and an insult on the reader's understanding.

---

* *Vestiges of Creation*, &c. 6th Edition, p. 128. See also *Explanations*, &c. pp. 91—103.

Not, however, to comment any longer on this diseased logic, let us dare to look honestly to nature for our basis, and appeal to such facts as have a true bearing on the question.

In the first place, it is not true, "that the final Cretaceous beds were deposited in seas unusually deep." The Green-sands, and other beds, forming the base of the Cretaceous system, are certainly not the deposits of a very deep sea. The innumerable shark's teeth, coprolites, echinites, and other fossils of the Chalk, point, I think, towards the same conclusion. In the British Isles the highest Cretaceous beds are wanting: but in some parts of the European continent (*e. g.* Maestricht, coasts of Denmark, &c.) we meet with a great superior group (a true part of the Chalk formation), which was unquestionably deposited in a shallow sea. Again, though in France and the British Isles there is a great break between the upper Secondary and lowest Tertiary deposits, yet are they so developed in some other parts of Europe that we know not how to draw any line between them that is marked out by any decided change of physical conditions*. Hence I venture to affirm that we have neither proof, nor probable evidence, of that enormous lapse of ages, between the periods of the upper Chalk and the lower Eocene deposits, which the Author's theory demands, in order that he may find time to join together the broken links of his organic chain.

---

* Since this part of the Preface was written, several Papers have been read before the Geological Society of London, by Sir R. I. Murchison, wherein he shews—that through the Eastern Alps, and in some other parts of Europe, there is no physical break between the upper Secondary and the

As a matter of fact, there is an enormous organic interval between the *fauna* of the Cretaceous period and that of the lower Tertiary deposits; and numerous terrestrial Mammals were, by some means or other, drifted into these deposits, and there became entombed: and we have a right to conclude that, during the same period, Mammals in thousands lived on the dry land and perished without leaving any monuments of their existence. But how came these multitudinous tribes of Mammals on the dry land? We say they were created, and the word describes the true condition of our knowledge. If they were not created, what was their genealogy? In no part of the Cretaceous system do we find the Ceteosaurs, which our Author (led astray by a mere name) regards as a generative link between Reptiles and Whales: neither do we find the Dinosaurs, which make some approach to the structure of Pachyderms. All these links are wanting, and so far the theory of development is wanting in all appearance of support.

But we are told, some of our *Carnivora* and *Pachydermata* may have sprung from *Cetacea* and *Phocidæ*[*].

---

lower Tertiary series. They seem to pass one into the other. But he has not found intervening organic types to fill up the gap between the Secondary and Tertiary *fauna*; or to give any colour to the hypothesis that the latter is but the transmuted progeny of the former.

[*] *Vestiges*, 6th Edit. pp. 336—340.

For the sake of argument, let us admit the possibility of such a parentage; but where is the geological evidence for its truth? Seals and whales certainly did not abound in any part of the great Cretaceous system. Not so much as one fragment of any marine Mammal has, I believe, yet been found among the Green-sands at the base of the Chalk. No such fossils have been found among the widely-excavated Chalk formations of the British Isles; and, I believe, no mention of any Mammal's bone appears in the catalogues of the upper Cretaceous fossils of the Continent*. Had the Ceteosaurs and Dinosaurs abounded in the Cretaceous system, and had their remains been found mingled with those of Seals, Whales, or other marine Mammals; then would there have been in our Author's hypothesis something with at least a similitude to truth. A positive dogmatic statement ought to have some positive facts to rest upon: but there are no positive facts to give colour to his statement, while there is a vast accumulation of negative evidence most plainly opposed to it. We may therefore dismiss it as an empty dream. It is utterly untrue as an exhibition of the powers of nature, if we are to appeal to living nature as our guide, and it is not suggested by the facts of Geology.

Again, were it true (which it is not) that the highest Reptile forms, and the highest types of marine Mammals that ever existed since organic life began upon the face of the earth, *were* all crowded into the upper Chalk and formed a prelude to the part afterwards taken up by the Mammals of the Tertiary period, how much nearer should we be to any proof of the theory of development? By what process, founded in anything we learn from the book of Nature, were Seals to breed into Lions? How were the Ceteosaurs to strip off their haunch-bones and hinder legs so as to pass into Whales? And, supposing that we have thus fabricated Whales, how are we again to invest them with pelvic bones and hind legs; and teach them to flounder out of the sea upon the dry land, so as to become gigantic Pachyderms? We have Seals, Lions, Reptiles, Whales, and Pachyderms, performing all the functions of life before us; and we know that Nature has put a wide barrier between these different Orders, so that one cannot now pass into another. Supposing that like organic types existed in an older world, we must accept the same negative conclusion, or desert the only sure foundation on which material science ever has been or ever can be built.

---

* In his last copious Catalogue of Cretaceous Fossils Geinitz mentions not any Mammal's bone.

While our Author steers clear of facts he is so far consistent with himself that he seldom makes a wreck of his arguments; but the moment he reasons on details he inevitably blunders—partly because he is not well acquainted with the facts about which he ventures to reason; and, still more, because neither in her broad outlines nor in her detailed workmanship will Nature conform herself to his hypothesis. By way of illustration, I will take one example from his *Explanations* (p. 96, 97): "I meet (the Reviewer) again," he tells us, "on special grounds. Many of the animals of the Tertiary period are of large bulk. We have not only huge examples of the pachyderm Order"..." but we have equally vast creatures belonging to the rodent, the edentate, and other Orders. These huge mammals are the signal forms of this period"..." Now, if we take the living pachyderm Order, we shall find that the largest species are of the lowest organization. For example, the elephant, with its short metatarsus, is a low form compared with the horse, in which the heel is raised so much above the ground. This is a progress of character which could be shewn in many other families. It is a progress which may be generally described as passing from the phocal form of the hind extremities through the plantigrade to the digitigrade. Now this progress is coincident with the distribution of the various lines of animals in physical geography; for while the *first* are marine, the *second* are generally found in connexion with shores, rivers, and low grounds; and the *last* (always the smallest) with the more varied surface of the interior. When we find, then, animals of the *second* kind most conspicuous in this (tertiary) period, we have actual phenomena remarkably in accordance with the scheme of development. We look in, as it were, upon the world, or at least its chief zoological province, at the time when the lines had attained to the terrestrial mammal forms fitted for fluviatile and jungle life; and ere from these had yet sprung the whole of the smaller but more highly organized denizens of nature's common."

This is a most characteristic passage, and my comment on it shall not be long.

(1) Is there any proof that the largest Pachyderms are of the lowest organization? I believe there is not the shadow of any proof for this assertion: and it can only raise a smile when we find our Author, in some of the early editions of *The Vestiges*, contending for the humble and undeveloped type of certain Animals, only because they were diminutive*.

(2) Have we any show of reason for putting the horse above the elephant, *because* the horse's heel-bone is farther raised above the ground? By such a test the Ruminant Order must come above the Carnivorous: and Man himself, whether we place him on his hind legs or make him crawl on all-fours, must come below both Ruminants and Pachyderms.

(3) Have we any proof that the gigantic Mammals of the "ancient jungles" were the progenitors of "the smaller denizen's of nature's common?" None whatsoever. I will appeal to one example in illustration of this point. In South America we find the remains of gigantic Sloths (such as the Megatherium, the Mylodon, &c.) entombed in the superficial drift and other deposits through which the rivers now cut their way into the sea: and, on the sides of the same rivers, we find, among the waving branches of the forests, the

---

* Thus in his early editions he contended that the first Fishes were of very small size, and he argued as if this (supposed) fact were an indication of an inferiority of type. In like manner (when speaking of Molluscs) he still tells us, what is not agreeable to fact, that our oldest Cephalopods are of small size and inferior organization.

diminutive modern Sloths of at least two Genera. Are, then, these living Sloths of a superior organic type to that of the ancient giants which lived before them? And can we, without a mockery of sober sense, derive in the way of natural generation, the dwarf Sloths from the Megatherium or any other forms of the gigantic Edentata that lived in a former period? We can meet such questions only with an unqualified denial.

(4) It is quite certain that the greater part of the terrestrial Mammals found in our Tertiary deposits (whether marine or lacustrine), must have been drifted from the neighbouring shores into the beds where we meet with their remains. But what does this obvious fact prove respecting the mammals of the *same date* that were living at a higher level, or at a greater distance from these ancient shores? Mammals of other Orders may have lived, and probably did live, *contemporaneously* with those of which the remains are entombed in our Eocene deposits. Neither is it true that the Mammals of the Eocene period are by any means confined to Species fitted only for fluviatile or jungle life. I appeal to the lists of Cuvier's *Ossemens Fossiles*; and I may appeal to a specimen of the Order *Carnivora*, in the Cambridge Museum, which I obtained during a visit to the plaster-pits of Paris. There is, I think, good probable evidence to shew that terrestrial Carnivora of a high organic type existed before any of the gigantic Pachyderms (such as Elephant, Mastodon, or Dinotherium), which our Author seems to consider of the lowest organization of their Order.

(5) We have no proof whatsoever, from the facts of Geology, that marine Mammals of the Tertiary period preceded the terrestrial. Marine Mammals *may* have abounded during the period of some Eocene deposits; and we know on more direct evidence that they *did* abound in some of the upper Tertiary groups. But the bones of terrestrial Mammals abound also in some Eocene deposits:—a fact which is the more impressive when we consider, that these animals were not the natural denizens of the beds where we find them; and that every bone and every skeleton must have been drifted from a distance. Among marine deposits we may naturally expect to find the traces of marine Mammals if such existed at the time; but we have far less reason to look for the traces of contemporaneous terrestrial Mammals. Hence, on sifting the whole evidence, we are at least justified in concluding, that during the Eocene period terrestrial Mammals were as abundant as the marine.

(6) However broken and imperfect may be our direct evidence, we are certain that of our terrestrial Mammals some of the graminivorous Families must have been called into being before any of the carnivorous. This fact carries with it its own evidence, and is independent of all theory. The carnivorous tribes must have had flesh to feed upon. But if it be inquired what Order of graminivorous Mammals first flourished, either on land or in the sea, during the Tertiary epoch, we can give nothing better than a conjectural reply. Pachyderms were certainly very old, and *may have been* the very oldest of the terrestrial Mammals of this epoch: and,

if we are to trust our evidence, one of the oldest groups of this Order—that found among the Eocene deposits of the Paris basin—did not contain one animal of gigantic stature; but was made up of several Genera and of many Species, of beautiful organic types; the smallest of which was not larger than a Guinea-pig, while the largest only reached the stature of a small Rhinoceros. There is no ambiguity in the Species, nor is there any sign of imperfection or immaturity in these very ancient Pachyderms; and if we are disposed to apply our Author's heel-bone test, we must place some of them on the very highest pinnacle of their Order.

(7) Lastly, (before I quit my comment on the previous extract), I may state that the huge Mammals to which our Author alludes seem to have been called into being, not during the oldest, but rather during the middle Tertiary period.

I will conclude this notice of the Tertiary Mammals with some extracts from a Letter written by Dr. Falconer to myself not many days before he left England. It was sent in reply to some questions I had proposed to him respecting that magnificent collection of fossil-bones before alluded to (made by Major Cautley and himself from the Sivalik hills, that skirt the great Himalaya chain of Upper India). which is now placed by them in the British Museum. I need not tell the reader, that the recent work of Dr. Falconer (wherein he describes the fossil Proboscidea) is the fruit of great labour and consummate skill, and that its publication forms an epoch in the progress of Palæontology. But what bearing have the great discoveries, made by himself and his fellow-labourer, upon the discussions of this Preface? I will answer this question in his own words.

"The best reward for the labour of reconstructing so many forms, is the light which is reflected on the very points to which you refer. The group of the Proboscidea is now so complete in serial links of Species, and the line through which they range so extensive (viz. from the Miocene of Eppelsheim to the Modern), that they furnish the best elements I know of, among the Mammalia, for testing the doctrine of 'progressive development.'

"1. There is a clear and distinct organic gradation, or serial line of affinities, among the Species—such as we meet with in every well made out and extensive group in nature: but the appearance of the Species in time, and their distribution in space over the globe, do not correspond with their organic affinities as nearly allied forms*. Thus the Mastodon Ohioticus of North America is the extreme link of the chain at one end (and nearest in structure to the Dinotherium), while the Mammoth of Siberia (or Elephas primigenius) forms the extreme link at the other end. About twenty species are interpolated between them; yet these two forms were contemporaneous in the same post-Pliocene Fauna of North America. The Dinotherium of Eppelsheim became extinct perhaps millions of years before the appearance of one of its nearest affinities—the

---

* See the plates of outline heads at the end of No. 5. of Falconer's *Fauna Antiqua Sivalensis*.

Mastodon Ohioticus: but the Mastodon Longirostris of Eppelsheim, which belongs to a more distant subgeneric group, was a contemporary of the Dinotherium. I could quote many other similar instances as to the discord between the appearance of the Species in time, and their structural succession as allied forms.

" 2. The Species, on the other hand, shew no gradation of organic rank correspondent with their successive appearance in time. The oldest are not the lowest in type—nor are those of the newest strata of a more noble degree. Species from all the five subgeneric groups are irregularly intercalated in the new strata as well as in the old.

"3. With respect to their geographical distribution; the Species most nearly allied in affinity are often the most wide apart in geographical position. The Elephas nomadicus of India is excessively near, in the most essential point of dental affinity, to the Elephas meridionalis—the pliocene-fossil Elephant of England—yet their geographical habitats are seven thousand miles apart.

" 4. Further: the Species which are excessively near in dental affinity frequently divaricate, in the most surprising manner, in other leading points of their external form: thus the same Elephas nomadicus of India had an excessively short head with a singular protuberance like the coil of a turban; while its allies are characterized by a very long brow and flattened forehead.

" 5. Every point in the case goes to prove, that the Species were created of distinct organic types—that they have been continued distinct by propagation within a range of differences and varieties which is very slight. There is not the shadow of any proof or induction, that the forms we call Species are the offsets, by gradual transmutation, from a smaller number of original types. The combined demonstrations derived from the phenomena of their appearance in time and space, and their affinities, clearly point to the reverse. They were created distinct, and they have descended distinct.

"6. Geoffroy St Hilaire's assertion was—that the Sivatherium was the progenitor of the Giraffe. But so far from being allied, they are singularly contrasted, and the Giraffe was a contemporary of the Sivatherium, in the same Fauna. The Sivatherium does not break down the distinction between Ruminant and Pachyderm. It is a true and typical Ruminant with four horns"......

With this quotation from Dr Falconer's letter I bring to an end all details on the successive traces of organic life that appear in the authentic records of creation; but I may remark, while passing onwards, that the same insuperable difficulty we meet with in attempting to connect (in the way of natural genealogy) the Tertiary fauna with the Cretaceous, is repeated again when we attempt to derive the Cretaceous fauna from the Oolitic. This difficulty has been already pointed out by an allusion to the Fishes of the Chalk: but all, or nearly all, the Species (of whatever Class) are changed in like manner as we take a single step from the upper Oolitic beds to the lowest Cretaceous deposits.—The organic interval is enormous, and can best be comprehended in a well-arranged museum. A thousand links are wanting to give the appearance of support to any supposed organic genealogy, nor can so much as one single link be supplied without virtually begging the whole question under debate.

Resting, then, on no hypothesis, but guided by the evidence of the animal types that mark many successive epochs in the natural history of the earth. and carry us back through countless ages before the existence of man or any of his fellow-beings, and interpreting these types by the rules of analogy and sound induction, I adopt in all its fulness the conclusion of the Edinburgh Reviewer,—"that Geology—not seen through the mist of any theory, but taken as a plain succession of monuments and facts—offers one firm cumulative argument against the hypothesis of development."—This is not the enunciation of a positive dogmatic theory. It is but an humble negative conclusion, wherein we cast away from us the words of boasting, and do our best to place our language on the same level with our knowledge.

It is true that our knowledge of the organic sequence in the old world is imperfect: and this may be a very good reason for not risking the cause of truth by deserting the plain road of laborious observation, and pandering to the senses with the unsubstantial visions of a premature cosmogony. Many of the conclusions of Geology are however built on too wide a basis, and too severe an induction from well-observed facts, to be ever shaken. From time to time, during the progress of discovery, some of our verbal propositions may require a partial change—some of our boundary lines may require a new adjustment—and some of our supposed evidence (so far as it is negative) may be invalidated or utterly destroyed: but the great mass of positive facts must still remain; and the current of new evidence, brought to light during the labours of the last three or four years, has, on the whole, set in one direction, and added new force to the great cumulative argument against the theory of development[*].

When the Author of *The Vestiges* first published his theory, we were told that the scheme of gradual development (from the first germs of organic life in our oldest strata, to the full perfection of animated nature as we see it now before us), required but "simple and modest" steps—a gradual sliding from one species to another. Authors were quoted, and sometimes misquoted, so as to pervert their meaning—the uncertainty of many supposed Species, and the endless subdivisions introduced by the (sometimes perhaps perverted) ingenuity of naturalists, were dwelt upon—and the modifications of individual types, from the lapse of time, the changes of climate, and other external conditions, were put before us with plausible skill. But all this was done to little purpose.—As the constancy of material laws is the foundation of all natural science, so is the constancy of animal forms (within the narrow limits of specific variations) not only the obvious fact, but the foundation of all physiology and natural history.

---

[*] In confirmation of this remark, I make one of my last appeals to the organic phenomena of the old world, by referring to the discovery of fossil Fishes of the very highest Order in the lower divisions of the Palæozoic rocks—to the very near agreement of the Palæozoic series in England and North America, as proved by the great State-Surveys—to the Memoirs of Professor E. Forbes regarding the distribution of certain organic forms among our very oldest fossil-bearing strata—and lastly, to the great discoveries of Falconer and Cautley.

Mr Babbage's calculating machine was then appealed to (with what seems to me an almost incredible misconception of the nature and meaning of mechanical evidence), as if it offered us some presumption that Species may change, and that the transmutation theory may be true.

It was admitted by the Author, that the living world throws little light upon his theory, and raises in most minds a strong prejudice against its truth. To the facts of Geology he therefore appealed, and on them apparently he rested his greatest strength. The organic phenomena of a former world were all marshalled in due theoretical order; and we were told, without hesitation or reserve, and in edition after edition, that such was the order made out from Nature's own records. And when he was afterwards informed that he had been leaning on a broken reed—that the order he had put forth was not the order of Nature's records—and that, while vindicating his grand position, he had crowded into his little book more positive and palpable mistakes than were ever before seen in any pretended book of science within the range of the English language, did he then withdraw his theory? This was too much to look for from one who had matured his theory before he was even moderately acquainted with the facts on which only it could securely rest. It was the reflexion of his own mind; and he had an evidence, convincing to himself, that was not derived from his knowledge of the outer world.

But he has another argument in continual reserve; and he now appeals to hypothetical facts which *may hereafter be discovered*, rather than to the positive facts already made out by geologists who have patiently deciphered and interpreted the true enduring records of creation. While doing this, he turns aside from the old inductive road to higher truth, and scorns the labours of those who are content to toil along that old dull road; and from their judgment he ventures, in no ambiguous terms, an appeal to the suffrage of the multitude.

I have no wish to misrepresent either our Author's scheme of Nature or his reasoning; and in vindication of the previous comment I will, notwithstanding the weary length of this Preface, add one or two extracts from his published works.

"Of the transitions or transmutations implied in the development theory, the greatest or most violent are those few which took place in the passage from the invertebrate animals to fishes, from fishes to reptiles, and from these to the higher classes. This we might expect; as at such points the phenomena had nothing to do with external circumstances, but wholly depended on the internal development-force—each stage being one of that limited number of periods into which the long-enduring gestation of Nature was divided. Here accordingly we shall always find the affinities less distinct than elsewhere; and yet in all of them some connexions are visible, leaving the general fact of the transition indubitable*."

My notes on this strange passage must be short. (1) He imposes on his reader, as well as on himself, by turning a mere rhetorical figure into an argument. The long-enduring gestation of Nature; the universal womb of Nature; and other like expressions that are scattered through his pages, may help us in turning a sentence: they mean nothing, however, at any given period of time, but all the wombs of all the living things in the vast kingdoms of animated Nature. We cannot so much as conceive any combined power of gestation differing from that which is shewn in the gestation of the individuals composing Nature. And where have we, in animated Nature, any indication of fits and starts, and new phenomena in the powers of internal development? The assertion is but the covert assumption of a theory; and to test the theory we appeal to Nature, and she does not give us so much as one fact to lend it support. And here, at least, the ambiguity of Species, or, to speak more correctly, the useless multiplication of certain supposed Species through ignorance or vanity, will not serve our Author's purpose; for the question involves the transmutation of the Orders and Classes of the animal world. (2) When he states that the phenomena in question had nothing to do with external conditions, I believe he is mistaken as to the fact; and I am certain that the phenomena of Geology do not give colour to the assertion. All, or nearly all, the greatest changes in the old organic types are marked, on the very spots where we find them, by great changes of conditions. (3) He once told us that his theory required only "modest steps"—a kind of gradual sliding scale, whereby one Species passed into another. He "had taken *existing natural means*, and shewn them to have been capable of producing all the existing organisms." He now deserts his old position, and tells us of a new internal development, and of "leaps in the development-process," which are out of harmony with all we know of Nature, and jar against any rational conception we can form of a true material law. One who has any just notion of the grand simplicity of Nature's onward movements will turn away with loathing from this new saltatorial philosophy. The modest steps of Nature, to serve a purpose, must be urged into most immodest bounds—something like the fabled strides of old Ocean's God, which thrice repeated would carry us beyond the limits of the world. (4) One thing the extract, above quoted, seems to prove—that a man who can surrender his faith to an hypothesis before he is well acquainted with the facts, on which only it can be built, has a mind ill qualified to grapple with any exact question of science; and that, while under the delusion of his hypothesis, he may see indubitable proofs of connexion even where the links of his ideal chain have been snapped asunder, and when all the facts of the living world of nature are in conflict with his system of belief.

---

* *Vestiges*, 6th Edit. p. 283.

I will conclude this protracted discussion on the development of organic life during the Tertiary period with one or two illustrations of our Author's very singular modes of reasoning. My first is taken from a passage of the *Explanations*, too long to be extracted entire (pp. 153—158), which ought, one might think, to be severe and logical, as it follows a long quotation from the stern *Logic* of Mr Stuart Mill. We may admit that certain Species (very small, however, in number) have lived without change from the early Tertiary period to our own days. Our technical language is constructed on this assumption, which is taken as a fact, and not as an hypothesis: and in all such cases we naturally conclude that the living Species are the lineal progeny of the same Species that lived before them. The conclusion is built upon our knowledge of the actual world, and the organic laws by which it is governed. Next let us suppose, for the sake of argument, that some animal, such as the *Ursus priscus*, though considered by the best anatomists of an extinct Species, is the natural progenitor of the living Bear: and what will this prove except that naturalists have blundered among the specific types of one Genus? Shall we, from this or any other *hypothetical blunder*, dare to conclude that Species, and Genera, and Orders, have no fixed place defined by the laws of organic nature? This is our Author's pretended logic: and it will not serve his purpose without many transcendental leaps that are a mockery of all the steps of sober reasoning. Therefore, he concludes, all the present Mammals are but modifications, by transmutation, of the Mammals of the Eocene period! On a scheme like this, there is neither sobriety in nature's movements nor constancy in her laws. We are called on to believe that Geese may hatch Rats, and that Cassowaries may hatch Kangaroos—that Seals may breed into Lions, and Whales into Elephants—and that Monkeys through good-breeding may become Men. This scheme calls on us to believe in a congeries of miracles (for what is a miracle but a violation of the orderly course of nature?); and it puts our language out of all true co-ordination with our knowledge. We use the word law to define the ascertained orderly movements in nature, whether animate or inanimate; and the successive changes we contemplate are connected in our minds under the ideas of material cause and material effect. But the moment we are led to speculate on the beginning of things—whether it be the beginning of a Solar System or the beginning of some new Order of organic life—we are inevitably led to a conception of the First Cause, and we define the fact now under contemplation by the word *creation*.

The word *creation* has a negative meaning so far as it regards ourselves; and implies, that we pretend not to climb to heaven, like the fabled Giants, by piling mountain upon mountain—that we pretend not to scan the whole workmanship of God, and ask why his creative power was only exercised at one time or place, and not at another time and in another place—that we dare not define the act of God in beginning a new order of things, by a word which only defines our knowledge of some law and order already established in time before it became an object of human thought. The order of nature is seen, and may be partially understood by patient study, and the phenomena may be linked together under some rational conceptions of effect and cause, and then we define our knowledge by the word law. Our knowledge, thus defined, does give us some glimpse of God's dealings during a time which is but a moment of eternity, and through a space that is but an atom of infinity: but it gives us no conception of the mysterious operations of his everlasting will, which moved him either to create or to withhold his creating power.

In another sense the word *creation* has a meaning that is positive. It implies our belief in a fact; and it also implies our belief that such fact was the offspring of prescient thought and design—it implies, in one word, the personality of the Godhead. Many, I know well, will deny the positive reality of any such belief; but this remark applies not to our Author; who sometimes forgets his theory, strips himself of the beggarly elements of his material scheme, and writes both with good sense and good feeling on the great mysteries of creation.

But to return again to the question before us. He tells us* that the few shells of the Secondary period which struggle, without any change of specific type, into the Tertiary system, give us a proof "in rigid reasoning, that all the Tertiary Species were descended from the Secondary." While we accept the fact, we repudiate the conclusion. Because one or two Species have undergone no change during a very long period, and the last of these unchanged Species are considered as the legitimate progeny of the first; therefore we are to conclude (in what he pleasantly calls "rigid reasoning") that new Species, new Genera, new Orders, and new Classes, are derived in the way of natural generation from certain humbler Species that lived before them! Nay, we are told that the cultivators of science must accept this conclusion, if they "only allow themselves to follow the dictates of reason, against the behests of prejudices unworthy of them and their age!" What is this assertion but the enunciation of an hypothesis that is neither based on any observed law of nature, nor suggested by the facts of Geology? While he presumes to sneer at a set of truth-loving men, in whose researches he has never joined and whose reasoning he does not comprehend, he gives us not the sober conclusions of inductive evidence; but a scheme of nature, the evidence for which is only found within himself, springs out of the peculiarities of his own mind, and leads him to the hypothetical conception of an order different from that of nature. The cause of physical truth can never gain by such an outrage against sober inductive reasoning.

---

* *Explanations*, p. 157.

From the newest Tertiary strata we pass naturally to a consideration of the great changes the earth's surface is daily undergoing from causes both aqueous and igneous, and from active forces whether chemical or mechanical: and it is only by a laborious study of these forces, and the effects produced by them during known periods of time, that we can form any true notion of the dynamical powers residing in the world as it now is. Again, we have the living world before us, and from it we derive all our fundamental knowledge of the organic laws that govern the living world. Starting with this knowledge, we pass onwards, and draw forth more extended truths by irresistible analogy, and by the application of principles well-established in the natural world. This has been the true order of all solid geological induction. While touching on this subject, the Edinburgh Reviewer briefly alludes to certain animals that have disappeared, or are fast disappearing, from the more thickly-peopled parts of Europe; and he takes for his examples the skeletons of Bears, Beavers, Wolves, &c., which are found under the bogs of the Bedford Level. "Had the traditions of Europe (he tells us) been lost, and we had known nothing of its early inhabitants, we might very properly have referred these remains to a newer Pliocene period; and had we taken up a theory, like that of our Author, we might have speculated on some of these extinct forms, and asked into what living Species they had passed by transmutation. As a matter of fact, we know that they perished by natural means—by the loss of shelter as the forests were cleared away, by the drainage of the bogs, and by the hand of man. And why not apply this reasoning to the old world? We say, on good analogy, that in the *Fauna* of any old period (*e.g.* the Oolitic) Species were gradually exterminated by the changes of physical conditions, or by the invasion of animals of greater power, and not by any transmutation into other Species. This kind of reasoning starts, at least, from something we know to be true; but it professes not to account for creation; nor can any natural means, within the ken of our senses and the limits of our knowledge, give us the least help in accounting for it*."

Some may think this argument of small value; but it has served one purpose—it has called forth one of the most striking illustrations of our Author's peculiar form of reasoning. "The removal (he tells us) of old Species is the result, by our Critic's own shewing, of law; and laws for the extinction of Species are in operation at the present day. Can we well suppose the rise of new Species to be a phenomenon of an essentially different character? for here is the whole question at issue. I say, No: any ideas I have acquired of philosophy, as an expression of our ascertainment of the order of nature, or Providence, forbid me to form such a conclusion." (*Explanations*, p. 95.) If here be the whole question at issue, let it be decided here: and when I appeal to any man of common sense, whose mind is not distorted by an hypothesis, he will tell me, I am well assured, that the extinction of wolves and beavers by the hunter and forester, and the production of new Species (whether by creation or transmutation matters not) *are* "phenomena of an essentially different character." If we choose to define by the word *law* the extinction of beavers and wolves through the operations of the forester and the hunter, and then by the same word *law*, define that sequence of the animal kingdom which geology puts before us, we only shew the poverty of our language; for we use the same word in two incongruous senses. An author who quotes a work of logic ought to know, that in all deductive reasoning, a middle term of comparison must have the same congruity with its two extremes, or it will lead to nothing but confusion of thought or palpable sophistry.

---

* *E. R.* p. 50.

§ 8. *Materialism. Mechanical and Moral Laws. Laws of Chance. Tendencies of Modern Science. Fantastical views of Nature. Evils of rash Generalization. Education, &c.*

In this Section of the Preface I have to deal no longer with the Author's pretended facts, but I must shortly discuss his adopted philosophy; and my remarks apply to the whole school of modern Materialists, so far as I comprehend their doctrines. I wish the reader to bear in mind, that by the words "spontaneous generation" and "progressive development," is implied something more than a theory which deprives Genera and Species, Orders and Classes, of all permanent reality. The high boast of this theory is, that it does away all distinctions between material and moral. It tells us that the soul of man is but a material mechanism—that all the complicated acts of his volition are but the natural results of a stern physical necessity, sometimes appreciable by numerical formulæ—and that they differ not essentially from the most vulgar sequence of second causes, or the calculated effects of mechanical impulse. So far as I can comprehend it, this is the inevitable and legitimate consequence of the theory. If in its first assumptions it be utterly untrue to nature, in its application it destroys the very essence of moral responsibility: for it takes away all semblance of human liberty, and thereby breaks down the barriers between right and wrong. It is, therefore, when accepted without reserve, mischievous, immoral, and antisocial. But it deserves not the name of theory. It is a rash hypothesis, and nothing better. A theory must be based on well-observed facts, or it is worse than nothing. For theory is but the embodying of facts and phenomena under the form of general propositions, drawn out in accordance with the laws of our intellectual nature: and as our knowledge advances, whether we be led to extend or limit the meaning of our first propositions, by the test of observation or experiment must they stand or fall.

A unity of plan reigns through all nature. A simple law of mutual attraction produces all the complicated movements of the heavenly bodies. A few simple laws (not comprehended under our first conceptions of mutual attraction, but co-operating with it) regulate the movements of the elastic and non-elastic fluids that surround the solid earth; and thereby minister to its fertility, to all the diversified effects of climate, and to all the physical wants of the countless beings that dwell upon it. A few simple laws regulate the movements of an elastic ether which is coextensive with the visible universe, and thereby produce the phenomena of light, and seem to wrap in one common element the remotest bodies of the known world. But more than this—all these several laws work together without conflict or collision, and end in beauty and harmony and order. This we comprehend under a law of adaptation, or a unity of will in that central Power which ordained all things; and thus we naturally rise to a conception of the unity of the Godhead.

The moment we pass, in thought, from dead matter to other portions of matter endowed with life, we see a new nature superadded to the old, and worked out of it, but not comprehended in it. If we apply the word *law* to the orderly movements of bodies held in our system by gravitation, or grouped together in definite combinations by the laws of chemical affinity, we use the word in a true and definite meaning, which changes not so long as the course of nature shall endure. But the same word *law* does change its meaning when we speak of the organic development and economy of the animal kingdom. We now contemplate organic structures, and cycles of material movements confined within themselves, and governed by laws adapted only to the conditions of an individual form of life. We see, in short, a complicated mechanism adapted only to the wants and functions of a sentient being. But this is not all: the whole mechanism is put in its ordained movements by sensations and volitions—by appetencies and wants—which have no similitude, either in their beginning or their end, to the attractions of dead matter on dead matter, or to the elective affinities of material elements. Orderly movements and combinations in the animal world imply some corresponding laws; but different laws from those out of which spring the movements and combinations of dead and inorganic matter.

Again, when we rise to the contemplation of man, and all his operations, whether animal or intellectual, we find them amplified by new inherent capacities, governed by new laws, and urged onwards by superadded motives. He alone rises to a conception of the laws of nature, and of some Intelligent Power that ordains and upholds the laws to which every faculty of his mind and body are in bondage. He finds himself under a moral government; he forms a conception of right and wrong; and this conception pervades his language, and modifies, or ought to modify, every act of his social existence. His imagination often rules his course of life; and his hopes of future good make him bear and overlook the pressure of his animal wants. In his animal framework, considered merely as a mechanism ordained for a special organic purpose, he is not one jot more noble than the worm whereon he tramples; but in his moral and intellectual attributes he is widely separated from all other parts of the living world, and far above them.

In our contemplation of nature we behold, therefore, a world not governed by *one*, but by *many laws*; and each law so adapted to all the rest as to end in harmony and order. All this implies a unity of will in the great central and sustaining Power of the universe: and we thus ascend to a conception of one great Intelligent Cause ruling over all nature, dead, sensitive, moral, and intellectual. This belief, to every son of man, is the "mother of his peace and joy:" and it is no less the anchor and stay of every civilized community. Man *is* a religious being. Without religion he is in a state of savage darkness or moral mutilation: and whether the form of his religion be derived from a pure or a corrupted tradition, or spring from within himself, is immaterial to my present purpose; for I am not now asking what is the form of true religion: and however distorted it may be through ignorance and bad training, or the caprices of his fancy, or the pestilent vapours of moral taint, still the sentiment is there:—and though his ill-guided strivings to grasp the councils of his Maker be as powerless as the efforts of an infant in the nurse's arms, while stretching out its hands to catch the moon, still the sentiment remains an inherent part of himself: nor will all the powers of sophistry and darkness ever root it out, so long as there is a principle of Causality dwelling within his soul, leading him to the conception of general truth, binding the elements of his knowledge together, and thereby giving them strength and meaning—so long as he has any feeling of a law of conscience—so long as he has any perception of a law of moral government—so long as he has a conception of futurity, and a longing for future good.

---

* *Explanations*, p. 34.

Universal law and universal order we allow in the widest sense that can be given to the words of man: but because our language is poor, and we are constrained by this poverty, often to use the same word for things essentially different, we do not on that account impudently dare to limit God's power to one form of manifestation. So far as we have any glimmering conception of nature's laws, material or moral, we believe that they work together to a common end—we believe that their seat is in the bosom of the one unchangeable God, and "that their voice is still heard in the harmonies of the world." The reader will, I trust, pardon this seeming digression; for it has a direct bearing on certain passages that are scattered through *The Vestiges*, and have an early and more formal place in the Author's *Explanations*.

"We find," he tells us, "mechanical laws at one end of the system of nature: if we turn to the mind and morals of man we find that we have equally fixed laws at the other: the human being, a mystery considered as an individual, becomes a simple and natural phenomenon when considered in the mass*," &c. And how is all this proved? By the statistical tables of M. Quetelet of Brussels. He then adds, (p. 26) "that morals—that part of the system of things which seemed least under natural regulation or law—is as thoroughly ascertained to be wholly so as the arrangement of the heavenly bodies." .... "I am at the very first struck," (he says, p. 27) "by the great *à priori* unlikelihood that there can be two modes of Divine working in the history of nature; namely, a system of fixed order and law in the formation of globes, and a system in any degree different in the peopling of these globes with plants and animals." The obvious inference then is—that as at one end of nature we have fixed laws that are material and mechanical, at the other end of nature (the intellectual) we can only have fixed laws that are material and mechanical.

---

* *Explanations*, p. 24.

If by nature we understood that mere atom of the universal world of which we know the material laws by observation and induction, it is true that all parts of it are bound together in a system of fixed law and order. But the grand unity of plan proves not the unity of means; for we know that many different laws may be so fitted together as to combine to a common end. If we are to trust our senses and our reason, there are not only *two modes*, but there are *many modes* of Divine working in the history of nature. But there is an infinity beyond what we see. After all that we have done, we have made but a few feeble steps towards the Fountain of all Light and Power. We know but an atom of the universe; and who shall dare to say that in the infinity beyond our ken nature has nothing more in store for higher orders of intelligence? Words give not the sense of sound to the deaf, or of light to the blind:

and who shall dare to say that the God of nature may not have seen good to work out the purposes of his will, in a thousand ways which we neither comprehend under the conditions of our being, nor could be made to know and understand through any powers of written language, or through any form of material symbols acting upon our senses? These thoughts ought, I think, to impress our mind with the extreme folly and arrogance of daring to adopt any form of *à priori* reasoning among the works of the God of nature; or of pretending to any knowledge of his attributes except what he has deigned to give us, or we have been permitted to discover by the honest interpretation of his works. Bold, dogmatic, *à priori* reasoning is a fault that taints the pages of the whole materialist school. While they profess to worship nature, they turn away from her and listen not to her oracles: and then they fall down before a stunted semblance of divinity which is modelled after their own fancy, and wrought into form by their own hands.

When it is said that the mind and morals of man are under the regulation of fixed laws, we admit the truth of the statement; for we believe that every law, material and moral, is ordained and upheld by a prescient, all-powerful, and unchangeable God. But when we take another step, and pretend to break down the distinction between material and moral law; and then go on to affirm "the simple fact, that morals—that part of the system of things which seemed least under natural regulation or law—*is as thoroughly ascertained to be wholly so as the arrangements of the heavenly* *bodies;*" the proposition, as applied to man's knowledge, is most palpably false. The word *chance* has no meaning when applied to the supreme, prescient Intelligence; but it *has* a meaning when applied to many departments of human knowledge. It has laws of its own worked out by rigid demonstration, and its results resolve themselves into numerical formulæ. But these formulæ, though mathematically true, tell us only of *probabilities*, and define not the certainty of any material events. Again, we can determine the numerical value of a man's life by the help of statistical tables; and thousands are acting, with wisdom and prudence, on this numerical knowledge: but it makes not the life of an individual one jot more certain: it gives a simple *probability*, and nothing else. And this knowledge is of a different order from that undeviating *certainty* with which we can define the results of a chemical experiment from our knowledge of the laws of elective affinity, or the movements and future positions of the heavenly bodies from the known mechanical laws of gravitation. Still wider are the limits of uncertainty when we come to speculate on the social acts of man—disturbed, as they are, by the wayward caprices of his will, and the perturbations of evil passion. That man, as a moral and social being, is under law, we believe true; but when it is affirmed that this law, as comprehended by ourselves, is of the same order with the mechanical laws that govern the undeviating movements of the heavenly spheres, we believe the affirmation to be utterly untrue.

In the sight of God every act of man, from childhood to old age, is, we believe, as certain as the ordained movements of the heavenly bodies; and we all allow that the Maker of the universe can work out the ends of his prescient will by the actions of responsible and moral beings. Out of this conception of the God of nature spring some dark unsolved questions on fate and free will, by which the reason of man may well be staggered: but he finds his solace and support in a knowledge that is enough for his practical guidance through life—in the hopes of higher knowledge and future good—and in a belief (it may be, after he has strained his soul to thoughts of almost insufferable tension) that he is still at an immeasurable distance from any real conception of the Godhead. He dares not, therefore, advance beyond the narrow boundaries of his own knowledge, and tell of the first movements of the prescient will of God, in ordaining the laws of creation. He disclaims all *à priori* reasoning on such a question; and where he sees but in part he is humbly willing to resolve all seeming contradictions, if such there be, and all moral difficulties, into his own immeasurable distance from the everlasting Fountain of Light and Truth.

We know that men have a common nature, are governed by common material and moral laws, and are exposed to common temptations. There is therefore a common similitude in their actions and their fortunes in life. We want not the statistics of crime to prove this: but the statistics of crime have a great value; for they put before us, in a tangible form, the desolating effects of bad government, of ignorance, of irreligion, and of superstition. Hence they may be of the greatest value as a guide to the best objects of human polity. But their tabulated results confound not our conceptions of moral and material laws. The effects of a moral law admit of palliation or change, aggravation or diminution—Not so can we change a material or mechanical law. Its operation ends not in averages, but in undeviating certainties. Uncertainty and choice enter no longer in as elements of our thoughts, and a stern unbending necessity rules over our calculated results.

I affirm then that the moral conduct of man (whatsoever it may be in the eye of God) is not, like the movements of the heavenly bodies, bound up in any conception of a constant, undeviating law; and that the Author of Nature, so far as we can rise to a conception of his attributes, either from his works or from his word, has not ordained one only, but many different laws for the government of the world*.

In the midst of an astonishing congeries of blunders on questions of fact, and of reasonings, perhaps, peculiar to himself, there is one topic of consolation for the Author of *The Vestiges*. "The question lies not (he tells us) between two philosophical theories; but between one philosophical theory and a view of nature which does not profess to look to Nature for a basis. As a system, moreover, which finds none of the previous labours of science shaped or directed in favour of its illustration, but all in the contrary way, it obviously calls for every reasonable allowance being made for its defects. It may be a true system, though one-half the illustrations presented by its first explication should be wrong*." It is not historically true, that he is the first expositor of the theory: he is but a humble follower of a very ancient school. There may be new illustrations, and there are bold assertions in his book which, I can well believe, were never made before by any well-informed physiologist; but it contains not one new principle that has any true bearing on the questions in debate. In proof of this assertion, I appeal to an excellent little Work by the Master of Trinity College (composed of extracts from a Work published before the first appearance of *The Vestiges*), wherein all the leading doctrines of transmutation and development are met on philosophical grounds and ably refuted†. It is, however, true that the Author of *The Vestiges* is the first *popular expositor* of this theory in the English tongue. This "bad eminence" he has reached; and I envy him not the possession of it. But I deny that his scheme is philosophical; for it is not built upon so much as a pretended basis of fair induction; nor has he the remotest right to tell us of *looking to nature for a basis*, while he closes his mental vision against the moral and intellectual elements of our nature, which are as much a part of ourselves as our limbs and organs of sense. His scheme is shallow, one-sided, and inadequate—a dull materialism that takes no proper philosophical notice of the grandest phenomena of nature—that confounds physical and moral evidence, and virtually shuts out from us those principles, which in all ages of our history, and in all fluctuations of opinion, have been the good man's stay and guide. If it be false in its pretended proofs, it is also mischievous in its application; and there is neither truth, nor modesty, nor good taste, in the shallow statement—in one form or other, many times repeated—that there is no true philosophy out of the scheme adopted in *The Vestiges*.

---

* See Supplement to the Appendix No. VII.

---

* *Explanations*, p. 181.

† *Indications of a Creator*. London, 1845.

With all the flaws and imperfections in his pretended reasonings, he is, I doubt not, sincere in his narrow views, and I wish not to misrepresent him. I will therefore endeavour to justify the language of the previous paragraph, by one or two extracts from his *Explanations*. "One after another (he tells us) the phenomena of Nature, like so many revolted principalities, have fallen under the domination of order and law; but here (*i. e.* in the organic kingdom) is one little province still faithful to the Bœotian government; and as it is nearly the last, no wonder it is so vigorously defended." (p. 142.) ......" The whole question (he adds) stands thus. For the theory of universal order—that is, order as presiding in both the origin and administration of the world—we have the testimony of a vast number of facts in Nature, and this one in addition—that whatever is reft from the domain of ignorance, and made undoubted matter of science, forms a sure support to the same doctrine. The opposite view, once predominant, has been shrinking for ages into a lesser space, and now maintains a footing only in a few departments of Nature which happen to be less liable than others to a clear investigation. The chief of these, if not almost the only one, is the origin of the organic kingdom. So long as this remains obscure, the supernatural will have a certain hold upon enlightened persons. Should it ever be cleared up in a way that leaves no doubt of the natural origin of plants and animals, there must be a complete revolution in the view which is generally taken of our relation to the Father of our being." (p. 149.)

Where is the man (we reply) among the cultivators of science who denies that the whole of nature (material and moral) is under the dominion of law and order? Ever since the days of Galileo (and we might go farther back) the most patient intellects have been employed in tracing the order of nature and discovering her laws. Nor is there either truth or meaning in the ignorant sneer—that the laws of the organic kingdoms of nature (which our Author seems to consider but a little province of human thought) are still under a Bœotian government:—or that the best expounders of these laws (the great anatomists and physiologists of the last three centuries) have been guided by principles in antagonism with those which have led to the highest generalizations of material science. Whatever is reft from the domain of ignorance and empiricism, and brought under the true domain of science, forms, beyond all doubt, another proof of the universal empire of law and order. Where is the Bœotian school of philosophy (whether material or moral) that does not assert, and believe in, this great doctrine? I know of none.

If it be affirmed that the origin of the organic world has been determined by law, we believe the proposition true:—partly on the strength of what seems a sound analogy; for if the organic world be governed by law, we cannot believe that it commenced without law:—partly on its obvious adaptation to the existing laws of the inorganic world:—partly, also, on the ascertained historical development of the forms and functions of organic life during successive epochs, which seems to mark a gradual evolution of Creative Power manifested by a gradual ascent towards a higher type of being. But when it is affirmed, that the successive parts of the great organic sequence are related to one another only in the way of material cause and material effect, we test the proposition by an appeal to facts and experiments—the last appeal on all questions of natural science—and on the strength of this appeal we deny the truth of the asserted proposition. It is not merely not proved, but it has no similitude to an ascertained truth: and it involves, moreover, the monstrous, and one might have thought the incredible, absurdity, of comprehending things material, moral, and intellectual, in one incongruous category.

There may arise another question. Does our previous negative conclusion put our knowledge of the organic world out of harmony with the other portions of our sound inductive knowledge? We reply, No. The origin of organic laws, and the origin of all other material laws, are wrapped in the same inexplicable mystery. Human philosophy leads us not to any real conception of the beginning of things, or the commencement of phenomena. Her province is to interpret laws already established by a power superior to all things whether animate or inanimate, and to which no mortal can ever soar "on the waxen wings of sense:" for between ourselves and the Fountain of all power and intelligence there is a gulf no less than infinite, which neither created eye can pierce, nor imagination fathom.

Those who exclude from their creed all conception of a personal and intelligent God of nature, must believe that dead, inanimate matter may, without external aid and by its own inherent powers, work itself into what is vital, sensitive, and intellectual. They may maintain, that what we call law is mere material order, and nothing else; that what we call adaptation is but a dream of fancy; that what we call intellect and mind is but a form of material manifestation; that conscience is but a material weakness; and that the hopes of future good are but an idle material dream: and in all this they are, at least, consistent. But if, on the other hand, we do see law and order and harmony in the world, whether animate or inanimate, and if we discern within it proofs of adaptation, wisdom, and goodness—then, whether we reflect on the world without, or trace the laws of thought and intelligent act by reflecting on our own internal consciousness, we do gain a firm grasp of what is meant by the sustaining, as well as the creative power of God. One of these words (to repeat what has been said before) defines our conception of the orderly movements of the world and of the second causes whereby they are upheld; and implies also, in conformity with our internal consciousness, a personal sustaining Power. The other word refers to the beginning of things, and (in like conformity with our nature, and without pretending to limit or define the first movements of Creative Power,) refers to our conception of a great First Cause of all things—moral or material, organic or inorganic. To this belief we are constrained by what we see without us, and what we feel and know within ourselves: nor can we cast away this belief, unless we strip off those inner elements of our nature without which no sound system of philosophy ever has been, or ever can be, built up by man.

One great truth is, however, contained in the concluding sentence of the previous extract. If the Author's scheme be right, "there must be a complete revolution in the view of our relation to the Father of our being." Man must be shorn of his highest attributes and his best hopes. The God of nature must lose His personality—He is no longer, in any moral or christian sense, our Father; but we must look for our paternity among chattering monkeys and old sea-monsters. Morality and the acts of a responsible will have no meaning; for acts and events are wrapped up in an inexorable material fatalism. Religious homage is rank folly; for who can utter any prayer against events chained together in the unvarying sequence of material causes? And if, on this material scheme, we be so inconsistent as to believe in a Creator, we must believe Him reposing far from us in a sublime "tranquillity altogether new;" and our contemplations, at the very best, must be like the moping homage of a Buddhist priest.

But in one thing at least our Author is mistaken. A creed like this is not "altogether new." In the latter years of the past century it had its priests and apostles; it spread and was believed; and it was carried out in the acts of civil government. When religion changed its object, things and acts changed also their name and nature: rapine took the name of justice; bloodshed took the name of philanthropy; and the groans of a fellow-creature were a mockery to a new priesthood, who told their victims that they were but lulled to eternal sleep, and must bear the axe with patience; for their elements, though dissipated now, would soon rise again under some new, and perhaps better, material combination.

Is it true (as our Author dreams) that the progress of science tends towards a confirmation, and consequent reception, of his hypothetical scheme? I think the very contrary. A bold idealism animates the philosophy of one large section of the German school, and may perhaps have sometimes led to physical discoveries: but it has, too often, ended in fantastical notions of the powers of nature, and in idle and false views of material knowledge. Under many aspects, however, it is in direct contrast with the stunted scheme of rank materialism.—That a rank materialism has prevailed among some eminent teachers of France, cannot be denied. But even now, they neither, I believe, form the majority; nor are they the "lords of the ascendant" in progressive knowledge: and any sober Englishman, who studies the works of the late leaders of the opposing schools of France, must be struck with the clear inductive logic, good taste, and manly sense of Cuvier, when put in contrast with the hazy and mystical pomposity of St Hilaire. I am not here comparing the anatomical discoveries of these two great physiologists: I speak only of their taste, and the manner in which they put their general views before us. In America the progressive sciences shew us, I believe, no general phase that sets them apart from the sober views of the philosophers of this country.

Our Author tells us, that in his scheme of nature "he finds none of the previous labours of science shaped or directed in favour of its elucidation; but all in a contrary way." It is no doubt true that a book of natural science (like certain chapters of *The Vestiges*) might be drawn up in the language of an hypothesis; and that the animal kingdom, including both the extinct and living forms of life, might be arranged in some preconceived order of natural development. And if this arrangement were accompanied by a new dogmatic and technical language—implying and taking for granted that, on the whole ascending scale (no matter whether composed of one or a thousand lines of natural ascent,) each part of the ascending series was derived, in the way of common generation, from that which went before it—our narrative would have at least the symmetry and external form of a true history. But, after all, it would be but a physical romance, and a work of imagination; and its language would be no better than a downright cheat: for neither would it, as a system, have its base in true induction (the only historical evidence of science); nor would its successive chapters fall into any true accordance with those ancient chronicles which were written in successive times, on the enduring monuments of the earth, by the hand of nature.

It is, however, by no means true that none of the labours of physiologists have been directed to an elucidation of a system of rank materialism: but it is true that the whole body of material science, as we now behold it, has a shape and substance that has no family likeness to the ill-formed progeny of our Author's brain. And who (we may ask) have been the labourers that, for the last three centuries, have given the present shape and substance to the great body of physical truth? Not men who built only on theory; but men who, at every turn of thought and opinion, *did look to nature for a basis.* Some of them were atheists, and some were deists; some were sober believers in religious truth; and a few of them were mystics and fanatics: but guided by nature, and believing (and ever since the days of Bacon constrained to this belief by the strong opinion of thoughtful men) that material knowledge must rest on fact and experiment, they followed their onward course, and the whole body of science became what it now is: and if it have a shape (as our Author tells us) that favours not the elucidation of the theory of development, then is the theory untrue to nature, and must be cast away among the dreams of an unsound philosophy.

But he has another arrow in his quiver. While he ridicules, with some show of truth, the minute philosophy of the present day, he forgets that true material science calls nothing little which is found in the record of nature's works; and that some of the noblest generalizations of the human mind have been suggested by minute experiments. But all our philosophers, both small and great, are to be included in one category of folly. They are dull guides, and blind interpreters of nature; and all their combined labours "offer no right preparation of the mind to receive with candour, or to treat with justice, a plan of nature like that presented by *The Vestiges of Creation*. No, it must be before another tribunal that this new philosophy is to be truly and righteously judged!" (*Explanations*, p. 179.)

This is the last formal quotation from the Author of *The Vestiges* with which I shall detain the reader of this Preface: and it well deserves to be the last; for, spite of its solemnity, it is more rife with folly than any other passage of his book. It virtually discards all ultimate appeal to physical nature in our adjustment of questions that are physical; and, at the same time, counts for nothing the opinions of men who for ages past have been toiling onwards—slowly, it may be, but steadily—while deciphering the obscure phenomena of nature, and bringing the material world under a right conception of universal law and order.

There is in the human mind an eager craving for general truth, which, when rightly tempered and directed, is of inestimable worth; but, when left to itself, makes us overstep the modesty of nature, and ends in one-sided and incongruous theories. Ignorance ever has been the parent of rash, abortive generalizations, which have been mischievous because untrue; and have been chiefly mischievous because they have stood in the way of a right onward movement. Men have ever delighted to repose in the luxury of speculation who could ill brook the repulsive toil of analyzing phenomena, and cutting their way, step by step, through the solid rock on which stands the temple of material truth. A Satanic bound over the fences of Paradise (meet matter for the imagination of a poet) is far more grateful to the neophytes of a bad philosophy, than a loyal obedience to nature, sanctioned by a patient study of her laws and, therefore, based on true knowledge. Hence schemes of Cosmogony had their being long before Geology was heard of; Astronomy was drawn into Systems two thousand years before its first mechanical principles were comprehended; and in every part of Physics men were willing to appeal to the theoretical jargon of their schools rather than to a response drawn from direct experiment.

After a long dark age of science the half torpid powers of man became reanimate, and a goodly crop sprang up from a better culture; but a crop of rank weeds sprang up with it. Alchemy, Astrology, and other fooleries of a former age, seemed to rise up with fresh vigour, when the mind of man, after a long fallow, began to germinate with new luxuriance: and if, during the last three hundred years, Philosophy has moved on with steady strides, Folly with his cap and bells has ever been seen and heard by the side of Philosophy. Some of the fooleries of former years were laughed out of sight by the robust satire of Ben Jonson: but folly, like the moon, has its days of waxing and waning, and then comes round again: and though it may change its name, and call itself the harbinger of wisdom, and though it shift the colours of its motley, it passes through no organic transmutation or specific change.

Let us but condescend to look at the old Poet's picture of the solemn, fashionable fooleries of his own day[*]:

SUBTLE.

Nature doth first beget the imperfect, then
Proceeds she to the perfect. Of that airy
And oily water mercury is engender'd;
Sulphur of the fat and earthy part; the one
Which is the last, supplying the place of male,
The other of the female, in all metals.
............These two
Make the rest ductile, malleable, extensive.
And even in gold they are; for we do find
Seeds of them, by our fire, and gold in them;
And can produce the species of each metal
More perfect thence, than nature doth in earth.
Beside, who doth not see in daily practice
Art can beget bees, hornets, beetles, wasps,
Out of the carcasses and dung of creatures;
Yea, scorpions from an herb being rightly placed?
And these are living creatures, far more perfect
And excellent than metals............

---

[*] *The Alchemist.* Act II.

SURLY.

Pray, you, Sir, stay:
Rather than I'll be bray'd, Sir, I'll believe
That Alchemy is a pretty kind of game,
Somewhat like tricks o' the cards, to cheat a man
With charming....................

Folly seems immortal; and what quackery and foolery of the old Poet's day is not rife in ours? It may have changed its name, but it has not changed its nature; and, like all other things of this living world, it gives the lie to the theory of transmutation:—"Nature doth first beget the imperfect, then proceeds she to the perfect"—and what is this, in other words, but our theory of development? The old Poet tells us of the daily practice of breeding scorpions from herbs. We are more mechanical, and breed mites and raise carrots by the fecundating touch of a galvanic wire. He tells us of breeding metals from the elements, and transforming them at the bidding of our fancy. Our transcendental theorist has a higher flight. He now teaches us to sow oats and reap rye—to breed rats from geese—kangaroos from cassowaries—lions from seals, and elephants from whales. And not content with this, he takes a loftier bound, and turns dead matter into living mind, and jabbering monkeys into thinking men! What folly of the days of Alchemy shews not itself now with its family physiognomy and the stamp of its true pedigree?

It is rank folly, in matters of science, to trust to authority and discard experiment: but the rankest of all folly is to discard both experiment and authority, by an appeal to the suffrage of the multitude; and thereby to make philosophy a matter for brawling and ignorant declamation. On a question of personal interest an uninstructed man, of common sense and honesty, may be a good judge: but on a question of general science an uninstructed man is no judge at all: for, as a fact of general experience, first impressions are often false, and first generalizations are often rash and incompatible with the broader and higher views of nature. A poet and a satirist may laugh at the fantastic visions of a false philosophy, and call them "a pretty kind of game like tricks o' the cards, to cheat a man with charming:" but there is a solemn reality in the ills inflicted on the human family by the Father of lies, in whatsoever shape he may shew himself, which cannot long be a fit matter for mere scorn and mockery.

The present is a period of progress and change. All things, without us and within us, partake of a common movement.—Forms of government—schemes of material science—theories of just economy in the state—systems of psychology, and theories of moral sentiments—new-fangled forms of religious worship—the whole outward garb and fashion of society—all things seem ready to launch on the wild ocean of untried experiment. It is, we trust, the will of Providence that some good should spring out of this universal fermentation: and as in the material world no new combinations can arise without the play of some higher affinities than those which held together the forms of matter that went before: so, we may hope, that in the social and moral world, there may arise out of this spirit of change and movement some more enduring elements of political combination—some closer and more abiding laws of brotherhood and good will. But, alas! all great social changes are not from worse to better: and change itself, at least for a time, is a trying evil.

Ignorance ever has been the parent of much mischief, and there seems no safer way of putting down the Father of lies, than by setting up the empire of truth and reason. But how is this to be brought about? By the diffusion of sound knowledge. On this point there seems to be little difference of opinion in the world. There is, however, in the human breast that which, on social and moral questions, too often gives the apostles of mischief a mighty advantage over the honest and sober teachers of truth: and if that appetency for knowledge which our Creator has made a part of ourselves, must and ought to have its fruition through a good training brought within the reach of every member of the state, whether high or low; it is also true and certain, that knowledge, like everything else, may be turned to moral evil and social mischief: and it is no mere allegory, but a truth of religion, confirmed by historical experience, that the miseries of the human family first sprang from a search after knowledge by unlawful means, and by overleaping the fences set round it by the God of nature.

When all men are taught, many must be smatterers in learning; and these smatterers will often turn out the rashest theorists and the boldest teachers. Our voyage cannot be safe and prosperous, if we spread our sails before we have waited to take in our ballast.—In the conquest over the material world, men but ill informed in the higher physics may be of first-rate service as light troops; and may sometimes take the lead in great discoveries. But they cannot theorize consistently on the great mysteries of Nature without knowing what Nature is; and it is in vain for them to do the duties of the phalanx without its ponderous armour. In mechanical inventions, and in arts bearing on the utilities of social life, they may bring to the common stock results of inestimable worth.—Again, in many provinces of human science the wisest men are but smatterers and learners, and a man may sometimes be strong in one province who is a mere child in all the rest; and such a man may do good service, if he but learn to know himself, and step not beyond the narrow bounds of his own knowledge. But it is, at the same time, most true and certain, that, in the higher provinces of science, no man can see farther than those who have gone before him, unless he mount higher than they have done; and he cannot mount even to their level without a long endurance of patient thought and toil. Men, however, forget all this, through purblind vanity, and the love of noise, and the hate of toil, and the fond hope of reaping the harvest before they have either turned the soil or sown the seed.

It is true that physical science has advanced, and is advancing, with rapid strides: but it is also true, that false theories and portentous quackeries have kept pace with this movement. Within the last few years (not to mention a long catalogue of antisocial paradoxes and schemes of polity which, if carried out, could only end in another *Jacquerie*, and a barbarous levelling of the whole fabric of christian civilization) experiments have been impudently exhibited in our Capital which have far outdone the ancient tricks of magic—which have far outfooled the more sober follies of Astrology—and have shewn us transmutations that have put to shame the more modest changes wrought in the furnace of the Alchemist. What was the second-sight of the poor uninstructed Highlander to the mesmeric visions of his well-instructed Lowland representative sitting on the tripod of *clairvoyance?* What old compounds of advertising quackery could be named with the nostrums of a modern son of Æsculapius, who can lull to sleep a patient in another hemisphere, and feel the pulsations of his heart by touching one of the hairs of his head brought, by the last steamer, across the Atlantic? What tinkling of the old cap and bells ever came up to the music of our days given out by the mesmerized organs of Phrenology?

Nor does all the mischief of science, falsely so called, end in these outbreaks of impudence and folly—these foul blotches and eruptions on the surface of Philosophy. Men soon learn to be dupes of their own impostures; and nothing is more common than for a man who begins by cheating others, to end by cheating himself, and so to pass from an impostor to a fanatic: and fanaticism, whatever be its type, is as catching as the plague; for men will never learn that sincerity, however good and graceful in itself, is but a sorry test of truth and reason.

A mawkish religious sentimentality breaks out among the writings of our modern Materialists. It was just so in the days of Alchemy; and the initiated in the older transmutations formed a kind of mock priesthood who had their religious illuminations and solemnities. We are now told that we are to be humane to brutes, for we are of their blood, and that materialism is the fountain-head of charity, which is the end and aim of all religion. Hypocrisy puts on the mask of virtue to cheat its neighbours: but it is a great mistake to suppose that it does not often cheat itself, by mistaking the theatrical emotions of an actor for the test of an abiding inner principle. Materialism, without giving us one new motive for humanity, makes humanity ridiculous; and it deprives charity of its best meaning and its most exalted sanction.

Bacon hardly ever gives us a general precept that is not full of meaning; for the kind of inspiration that made him the prophet of physical science, animates also his practical maxims and moral sentiments—gives them the look of perpetual youth, and makes them live unchanged in defiance of time and the fluctuations of opinion. He tells us, in an early part of his immortal work on the Advancement of Learning, "it is an assured truth, and a conclusion of experience, that a little or superficial knowledge of philosophy may incline the mind of man to Atheism, but a farther proceeding therein doth bring a man back again to religion: for in the entrance of philosophy, when the second causes, which are next unto the senses, do offer themselves to the mind of man, if it dwell and stay there, it may induce some oblivion of the highest cause: but when a man passeth on farther, and seeth the dependence of causes and the works of Providence; then, according to the allegory of the poets, he will easily believe that the highest link of Nature's chain must needs be tied to the foot of Jupiter's chair." Farther on he writes as follows: "Another error is the impatience of doubt, and haste to ascertain without due and mature suspension of judgment. For the two ways of contemplation are not unlike the two ways of action commonly spoken of by the ancients: the one plain and smooth in the beginning, and in the end impassable; the other rough and troublesome in the entrance, but after a while fair and even: so it is in contemplation; if a man will begin with certainties, he shall end with doubts; but if he be content to begin with doubts, he shall end in certainties."

If these be the words of truth and wisdom, then, during the more general diffusion of material knowledge, must we look not merely for a plenteous crop of follies such as we have pointed out; but for deadlier mischiefs which may spring up into some form or fashion of infidelity, or it may be, into rank Atheism. Among the smatterers of science, our modern Materialists do profess, as a fundamental principle of their faith, "to dwell and stay among second causes, which are next unto the senses," and they never presume to rise above them; and if, through inadvertency, they speak of Providence, they tell us of some principle far beyond the reach of nature, "and reposing in a tranquillity altogether new." They do begin with certainties. Their theories are set before us like Minerva starting full armed from the head of Jupiter, and all men must bend before them and do them homage: and, assuredly, (if there be truth and reason in the words of Bacon) their certainties shall end in doubts.

Let a shallow writer, like the Author of *The Vestiges*, teach and make popular among the smatterers in material knowledge, that inductive science is but philosophy in leading strings—that the accumulated wisdom of past ages is but a kind of milk meet only for babes, and unfit for the food of full-grown man—that there is no difference between soul and body—that man is the progeny of beasts—that all nature (dead and living) is wrapped in undeviating mechanical laws—that acts are the undeviating effects of material organs—that the organs we inherit are drawn from nature's wheel, where we have as good a chance as our fellow-men, and therefore have no right to grumble at our lot—and that all conceptions of what is supernatural and immaterial are false, superstitious, and but the fogs of a Bœotian brain: and let this belief become current in society, and accepted by the multitude as true. What then will follow? The reader may judge for himself: I can see nothing but ruin and dire confusion in such a creed. It is not grounded on the evidence of material nature when sifted by a true inductive spirit; and on that account I believe it false. If current in society it will undermine the whole moral and social fabric, and inevitably will bring discord and deadly mischief in its train; and on this account also (having a belief in the harmony of nature and in an overruling Providence) I believe it utterly untrue. An honest Materialist may mean no mischief to his fellow-men; but that belief proves not his doctrines to be innocuous. He may be sincere; but sincerity, I repeat, is not the test of truth, whether we turn our thoughts to things material or immaterial.

Because advancing philosophy is fruitful in rash and foolish theories, is knowledge, therefore, to stand still? Because tares may spring up with the wheat, are we therefore to leave the ground unturned, and the seed unsown? To questions such as these no man in his senses will now dare to give an affirmative reply. But he will affirm with sober confidence that popularity is no test of right and wrong—that in many parts of teaching evil is far more powerful than good—and that a flattering philosophy is not necessarily true:—and he will conclude that unmixed good is not to be looked for in any general scheme of national training—and that a one-sided training must produce narrow-mindedness and bigotry, and other consequences of deadly mischief. In any good scheme of national teaching the material, moral, and religious parts of nature must all have their proper nutriment, or the body politic will fall into deadly disease, or imbecility.—But how these good ends are to be brought about in the struggles of party—among the crooked ways and crooked visions of narrow-minded men—amidst moral fanatics and material fanatics, and men who are too cold-hearted and selfish to be fanatical in any thing—is a question far too hard for this Preface. But there is, we have good hope, a power in high principle and truth that will work its way; and an overruling Providence that knows how to bring much good even out of much evil; and guided by this good hope we heartily apply the noble words of Bacon, not merely to the spread of knowledge among those who are called fortune's favourites or men of high station, or among men of academic leisure, but to the diffusion of sound learning among all the members of the state of whatsoever condition, whether high or low.—"Let no man, upon a weak conceit of sobriety or an ill-applied moderation, think or maintain that a man can search too far, or be too well studied in the book of God's word or in the book of God's works—divinity or philosophy: but rather let men endeavour an endless progress or proficience in both: only let men beware that they apply both to charity, and not to swelling; to use, and not to ostentation; and again, that they do not unwisely mingle or confound these learnings together."

§ 9. *Conditions of the Mind that have led men to deny a Personal Creator—Atheism and Pantheism—Illustrations of the doctrine of Final Causes—Galvanic and Phrenological Hypotheses, Mechanical Inventions, &c.*

It may perhaps be well to consider, through a few pages, under what conditions of the understanding men have been led to deny the evidence of a great personal, creative, and sustaining Power through the whole world of nature.

Atheism is at least consistent with itself. If a man believe not in God, he cannot believe in a Creator; but I stop not to argue with an avowed Atheist. I pause only by the way, to express my conviction that there is a proof (sometimes called *à priori*) of the being of a God, derived from the mind of man and the right exercise of its inner powers, which no one can gainsay without renouncing his reason, and its supreme authority in judging of truth and falsehood: and if this proof be not accepted, or be little suited to our habits of thought, there is assuredly a proof *à posteriori*, based on our experience of what passes within ourselves, and on our observation of what is external to us, that brings, or ought to bring, conviction irresistible to the human heart. But this question has been discussed at sufficient length at the beginning of this Preface and in the following Discourse, and I must not dwell on it here.

There is another form of unbelief, very nearly allied to Atheism, though passing under the less odious name of Pantheism. True Theism demands a personal preordaining Power. It demands a cause for all the phenomena of the universe, whether of mind or matter: it requires, in one word, a personal, intelligent God and Creator. Pantheism will perhaps allow all we understand in our first conceptions of mind and matter. It will sometimes tell us, and in goodly language, of the material and moral adaptations of the universe—of its beauties, its harmonies, and its laws. But it denies the personality of the Godhead. It is not, on this scheme, true that God created all nature; but that all nature is God; and the word *God* becomes no longer a personal term defining our conception of a Creator and Ruler over the world; but an abstract collective term to define and comprehend all the phenomena of the universe. In its grosser, and perhaps most common type, Pantheism deifies the dead elements, and advances not one single step beyond sensual phenomena. Man is the highest type of being—nothing but matter at its highest point of development. Material and moral are to be comprehended under one category. All within him and all without him is sensual; and his loftiest conceptions and highest abstractions are but marks of an inner and mechanical creative power. His ideas of external nature may have some archetype in the world without; but his noblest conceptions are but abortive dreams without substance or reality. He has no knowledge of Cause beyond that which is suggested to him sensually by the mere sequence of events within his own narrow material experience: and his higher conceptions of eternity, of infinity, and First Cause, are no reflexions of the being and attributes of a God; but are the material, and, it may be, the diseased creations of his own organic system. And as his organic structure, and all the powers residing therein, have sprung out of the combinations of dead material elements by progressive development; so out of this material development may spring something higher still: and hence (for something like this I have read of among the crazy dreams of a gross material Pantheism) though God did not create nature, yet nature may in the end evolve a personal God, foreshadowed now in nature's womb by god-like man!

But there is an opposite philosophical creed which has been called *ideal.* It denies the very existence of external material nature, and, in a certain sense, may be said to spiritualize the universe. This strange form of metaphysical belief has indeed been adopted by some good religious men. But whatever is contrary to nature must be false; and the almost inevitable fruit of such a creed is universal scepticism; or a form of ideal Pantheism, in which the material world is almost shut out from thought, and the mind of man is deified. Under such a creed, men have been taught that all religion derived from any authority external to themselves is no better than a dream—that all forms of belief are but types of the development of the mind of man, evolved by himself out of himself, and not given to him by his Maker as a rule of life. And if we take for granted the fundamental truth of the ideal scheme, this conclusion seems inevitable: for external teaching can only come to the mind through the senses; and if we begin by denying the evidence of sense, how can we admit the authority of any form of external teaching?

Lastly, there is one oriental form of Pantheism, still, I believe, held by many millions of our fellow-creatures, which makes God the only true personal existence, of which all the complicated phenomena of mind and matter are but the simple attributes. In this creed man has no true enduring personality; absorption into the substance of the Godhead is the end of all religion, and annihilation is the supreme good. Buddhism absorbs man into the Godhead, and thereby destroys all right conception of Creation and Creator. Pantheism, in one form of its extravagance, seems to absorb God into man; and, in all its forms, it confounds the God of nature with the natural world which is the work of his hands.

It is not my object to describe at any length the religious aberrations of the human mind. I have no capacity for such a task; but I may remark, by the way, how very little there is of novelty in many of the modern metaphysical forms of unbelief. Some of our modern pantheistic Rationalists have deserted the inductive onward track of truth and reason, and have gone back into the dreary labyrinths of ancient folly. In their zeal to uproot what we think the sure foundations of our religion, they have dared to mythicise the plain and simple narrative of the gospels, and to scatter to the winds the best elements of historic truth. And what is a fundamental part of the system of the most daring and subtle apostle of modern ideal Pantheism? Very little more (as shewn by Dr Mill*) than a revival of one of the ancient forms of oriental Pantheism. The Sabæans, and other old inhabitants of the oriental plains, seem to have worshipped the celestial bodies and the elements. But they endowed the elements with life and personal attributes; and their creed, rude and ill-informed as it was, shewed at least a striving toward the God of nature; and so far were they wiser and better than a Pantheist. Atheism brutalizes our manhood. Pantheism is but Atheism tricked out in the semblance of religion. It is in the natural world what rank idolatry is in the religious—a worshipping of stocks and stones. It does, indeed, acknowledge a sentiment of religion, and gives it a verbal homage: but it degrades the object of religion, and thereby degrades our manhood. For the true nobility of man is that he can rise in thought above the phenomena of the universe to the conception of law and order; and higher still to the conception of a personal, intelligent Power, the Ordainer of all law and order—that he knows himself to be the offspring of that Power, and therefore the child of God, with all the hopes and duties that arise out of such an exalted parentage.

Atheism and Pantheism strip us of one of the best elements of our intellectual nature. There is a *prin-*

---

* See the first *Christian Advocate Essay*, by Dr Mill. Cambridge, 1840.

ciple of causality within us without which we could never ascend to any conception of general truth, or of law and order, whether material or immaterial. By what means we rise to the abstract conception of *Cause* is perhaps of little moment to my present inquiry. I pretend not to discuss the theories of Hume or Brown, of Kant or Cousin, or of any school of psychology that professes to analyse the steps by which we rise to a general conception of *Cause.* The idea of cause may be in part suggested by the sequence of material phenomena; and it may be more emphatically suggested by the immediate acts and consequences of our own volition. But the succession of material phenomena, and the acts of his own volition, would never lead a man to the highest form of truth were there not a principle within himself, a part of his very being, whereby he is led to something far above what he knows and learns by his own experience.

It may indeed be said that we observe an undeviating sequence of material phenomena, and thence derive our first ideas of some connecting *material Cause:* but if we examine the origin and progress of our knowledge, it will, I think, be found that we have an earlier and firmer conception (however imperfect it may be) of a personal, intelligent, and *designing cause.* For in childhood, when we first begin to reason, we often endow the material things around us with life and volition. And in advancing age, after we have learnt to modify our first impressions, whenever we describe the order of material organic nature, we almost of necessity clothe our meaning in words expressive of the acts of a prescient and designing power.

When, with admirable skill, our countryman Layard laid bare the ancient palaces of Nineveh, and saw its sculptured stones and monuments, he doubted not that they were the works of a designing hand, though he neither knew the letters of the stone-graven legends, nor the events recorded in the sculptures. Among these stones were some which had been broken by what we commonly regard as accidents—others, which by long exposure during ancient and unknown times, had undergone decay from the corrosive action of the elements —many that were in the very places where they had been first fixed by the builder's hands. All the phenomena had their natural place and meaning, whether they were the results of accident, of material law, or of intelligent design. In every instance the philosophical observer referred each phenomenon to its appropriate cause; nor could his mind rest satisfied without drawing this inevitable conclusion.

Precisely like this is the conduct of the mind while studying the external world. Philosophically speaking, there are no accidents in nature. What we call accidents are the contingent effects of second or material causes; and are of such a nature that we can conceive these causes to be ordained, and to exist, without the production of the accidents we contemplate; or at least without any special reference to their production. In this sense the word accident is but an acknowledgment of our ignorance; and there is along with it a tacit acknowledgment, within the mind, of some higher order of material causation, which we define by the words *material law*. The deposit produced in a dirty kennel after a thunderstorm, is, we believe, as truly the effect of material laws, as the movements of the heavenly bodies are the natural consequences of a law of universal gravitation. And if we be constrained by a law of our being to ascend from the humblest conception of material cause to something higher and more general; so are we constrained from a conception of the general laws of nature to ascend higher still—to a conception of personal intelligence and design. The same reasoning that leads us to true historical conceptions among the monuments of old catacombs and palaces, leads us also to a conception of the higher truths of nature in our study of the works of nature. We see among the works of nature the *contingent effects* of natural laws which none but an intelligence of a higher order than our own could predict, analyse, and define. Such effects we may call accidents. We do also see effects we comprehend more perfectly, and can bring at once into subordination to material laws. We can study these laws, and we can sometimes predict their material effects with undeviating certainty; and we see them fitted together, with all the evidence of consummate skill, in the framework of the universe. More than this, we see examples, by tens of thousands, in which special material laws appear to be ordained for special objects; and hence we naturally rise to a perception of personal design, and intelligent causation.

The eye is made to see, the ear to hear, and the heart to propel the blood through the whole framework of the body; and the double heart is prepared in the womb, not to supply an existing want, but to meet a future want under a coming condition of the animated being; and thus we reach a higher conclusion still, (the highest of which the mind is capable, and in which it rests content) in the conception of a Supreme and Provident Intelligence. It is from this high point of view, and this only, that we can look back on our whole intellectual ascent, and rise in thought towards a right comprehension of law, and order, and cause; and thus bring all nature into harmony.

Rank materialism, as a scheme of nature, is shallow, inadequate, and false. It is the foundation of Atheism, Pantheism, and almost every modification of psychological delusion in our views of nature. We know that mechanical action and material motion may exist in countless combinations without sensation; and sensation is not a mere material conception. If there be sensation there must be life and a sentient being. And were we to allow that sensation is a mere material phenomenon, it would not help us to account for our general conception of cause, or for any of the higher abstractions of the mind. All general truth is made up of abstractions generalized (or created, we might say figuratively), in subordination to psychological laws within the mind itself. The mind is that principle whereby our thoughts cohere and have a personal unity within ourselves; and we have a truer conception of mind than we have of external material nature. The external world is first known to us by our sensations: but we rest not in our sensations. We are compelled, by the very law of our being, to project our sensations, as it were, back on the external world—to create (as has been said figuratively) the outer world anew—to clothe it with colour, and form, and attributes, and powers, which are given to it by the activity of the mind working in strict subordination to the law of its existence. To deny the existence of a principle in nature utterly unlike the mere organic implements of our bodies, or the action of material laws indicated by the sequence of material events, appears to me as rank folly as ever entered into the soul of man. To deny the existence of the material world is to strip the mind of its innate *principle of causality*, and to deprive it of an element of its being without which it never could have comprehended general truth or have reasoned either of cause or consequence. To deny the existence of mind, as something in its very essence distinct from matter, is to deny that of which we all are conscious. We have a personal will, a personal consciousness, a personal feeling of responsibility, a personal magazine of abstract thought, which we cannot confound with the material elements around us, without an audacious abuse of words, and a casting away of what we know of ourselves and of our inner nature. I can conceive one of my limbs to be lopped off, to be separated into ten million atoms, and to rise up again in the grass of the field: but I cannot so much as conceive the decomposition of the mind; for the idea of personal self is simple and uncompounded. I can conceive, I can speculate, I can abstract and generalize, I can reason of right and wrong—of truth and falsehood. But still, in this varied multiplicity of personal acts there is a central unity in the soul itself, that admits of no decomposition into separate parts. The God that made it could destroy it, if such were his will. This I can conceive; but I cannot, by any effort of the imagination, conceive my personal self to be so decompounded that its several functions should be resolved like the dead elements of a material body, and made to pass, one by one, into a new and separate form of conscious existence.

To analyse and separate our ideas, is one of the indications of an advanced knowledge. To confound things essentially separated, is a mark of uninstructed ignorance, of stupid indifference, or of audacious folly. Atheism, Pantheism, and rank Materialism, all labour under the same radical principle of falsehood. They pretend to build upon knowledge; but the knowledge on which they pretend to build never could have risen into substantial form without the existence of a *principle of causality*, which they virtually deny: and we may assume it as an axiom that such a form of reasoning can end in nothing but falsehood and incongruity. Pantheism (which is Atheism clothed with a decent covering), and rank Materialism, its twin sister, invert the whole order of that intellectual nature by which we reach the comprehension of general truth. They give us a pretended lever, but without a fulcrum—a building;

without a foundation—an effect, without a cause. The mind of man will not, and cannot, be content thus to dangle in mid-air: but we find our resting-place and refuge in our belief in the power and providence of an intelligent God and Creator of all nature.

Rank materialism is so full of moral mischief, and is so well fitted to play its part in popular delusion, that it may be worth while to notice three of its supposed modern illustrations. Those who can only admit "the real existence" of what is material, have sometimes compared the action of the mind to that of the galvanic fluid, pouring its current along the wires of an adjusted battery. With this they have been content; and have inferred, that mind is nothing more, or very little more, than one of the forms of electricity, and is, therefore, material.

Now let us admit (and it is, I think, a very large admission) that the first knowledge of external nature is conveyed to the mind by nothing more than a galvanic action running along the nerves of sense to the central nervous battery or brain; and let us further suppose, that the intentions of the will are conveyed outwards by a kind of reversed action of this battery, through a distinct series of diverging nervous chords, conducting a galvanic fluid from the brain to those organic implements whereby we communicate with the external world. In this view of material nature (if it be real) we may have made a new step in physiology; but, as to the philosophy of the mind, we leave it exactly where it was before; and we have not taken one step towards its comprehension, or thrown out one spark of light for its illumination. Mechanism is not sensation—understanding—thought. Material action, however subtle, is not Will. In that kind of muscular action we are now considering, we find not the *essence* of the Will; we find but the *manifestation* of the Will, acting on us and on the outer world, through the intervention of material organs, and in subordination to material laws.

In the noblest mechanical adaptation of material knowledge to the rapid interchange of thought—the electric telegraph—what is the intelligible history? First, there are certain galvanic phenomena apprehended by sense, and then moulded by the mind, inductively, into the form of a material law. And this conception of law is an intellectual act that bears no similitude to any act that is material. Secondly, there is an intellectual act, whereby we conceive the fabrication of a mechanism to give effect to our previous knowledge. Thirdly, there is a will to ordain and perfect its construction. Fourthly, when this is done, we have a mechanism perfect for its purpose: but we have not an animated or a thinking mechanism. To give it meaning, there must be a mind exterior to the mechanism to set it in its appropriate movements; and there must also be another mind, exterior to the mechanism and able to comprehend its movements. A mechanism of this kind may perhaps throw some light on the muscular activity of the bodily frame: but it throws no light on our sensations—on our abstract apprehensions of material laws—on our abstract conceptions of the outer symbols of thought—or on the movements of the will.

But this mechanism might perhaps have its moral use in helping to teach us our position in the world of Nature. It is by a conducting power in the mechanism of the material world that we learn the existence of the remote bodies in the heavens. At one end of this mechanism is man, with organs of sense enabling him to know that a direct message is sent down to him, and to perceive the distant spheres; and he has a mind so formed as to interpret the material symbols of this message, and by their help to comprehend, in part, the laws whereby the heavenly spheres are governed, and carried round in their ordained movements. There must then (if we but follow out an analogy suggested by the works of our own hands) be some external mind to contrive and lay down this mechanism, and an external will to set it in its ordained movements. There must, in one word, be an intelligent God of Nature. Thoughts of this kind, though they throw not the feeblest light on many of the higher questions of psychology, may perhaps be of some moral use in helping us to grasp more firmly our conception of the ubiquity of the Godhead, and of his never-ceasing power, manifested in the material laws of the natural world and in their adaptation to the mind of man.

The Phrenological hypothesis has been put forth as another illustration or proof of materialism; and in this light it seems to be regarded by the Author of

The Vestiges. I do not believe in this hypothesis; for it is not based on anatomical proof, nor does it give us any true analysis of the higher operations of the mind. The brain is a most complicated coil of continuous nervous chords; and it has no separation into parts resembling the distinct muscular integuments that surround the bones and act on them, as the levers of the body, by a distinct and separate contraction, which we can define mechanically, and of which we comprehend the function. The Phrenologists have not shown us any cerebral structure resembling this. They tell us of distinct cerebral organs, but have not proved their existence by the evidence of dissection. The fundamental phenomena of the system are certain external configurations of the skull, which are supposed to indicate a corresponding configuration of the outer parts of the brain in immediate contact with the skull. These external configurations (or organs) are assumed, on a supposed inductive evidence, to indicate a greater or less development of certain faculties of the mind, and to guide us to a true system of psychology. But the supposed organs are at once arbitrary and ill-defined. There is absolutely nothing in the skull itself to indicate a separation of the brain into thirty or forty distinct organs subservient to as many separate faculties of the mind. The prominent faculties of the mind must have been first known and separated by other and more appropriate evidence, or Phrenology could never have been thought of; for, unquestionably, there is no symbolical significance in the external form of the skull; nor does it lead us naturally to any knowledge of the anatomy of the brain or of its functions. I contend, therefore, *in limine*, that Phrenology (taking all its first principles for granted) is in no way fitted to help us in a true psychological analysis of the mind. The faculties of the mind (or, to speak figuratively, the intellectual organs) may be discriminated by a true psychological analysis; and if this be done, we can conceive it possible that these faculties may be somehow or other connected with certain modifications of cerebral structure, and consequently with certain modifications of the external skull. Should this be proved by good induction, we might then reason deductively from the external organ to an intellectual function. But let the reader bear in mind how much has been taken for granted in arriving at this conclusion. And should we admit the conclusion, let us also bear in mind, that, in the view here taken, the scheme of Phrenology may be an advance in cerebral physiology, but offers us no true advancement of Psychology. This kind of knowledge (if it were based in nature) would, however, have its psychological use; for it might teach us where lies our hidden strength, and so might direct us to our best course of intellectual training. But all these good effects are beyond reasonable hope; for the whole system is hypothetical, and, I think, devoid of anatomical proof.

Coming back to the question of materialism, and admitting, for the sake of argument, the whole system of Phrenology to be true, I affirm that it offers no shelter to the materialist. Cerebral organs are no more thought and feeling than the pipes of a church-organ are music and harmonious sound. Cerebral organs (on this hypothesis) may be recipients of transmitted knowledge from the world without; or, in their higher office, they may be a kind of leverage on which the mind acts, and whereby it communicates its knowledge and the purposes of its will to the outer world, whether animate or inanimate. But the eye that sees all things else, sees not itself; and the mind and will, though they lurk behind the organs of the brain, are not to be confounded with those material implements with which they are united by the God of Nature, and over which they have dominion and control.

One instance more, and I have done. The calculating machine of Mr. Babbage is brought forward in every edition of *The Vestiges*, and has been quoted for like purpose by other authors, as if it gave a practical illustration of the theory of development, and some support for a scheme of Materialism. Wonderful as is this mechanism, it only abridges the labour of thought; and, like the pen which is now tracing the characters I am writing, it is but an instrument to express in symbols the anterior conceptions of the inventor's mind.

A machine neither thinks nor makes itself. This is a plain truism; but it is a truism some men appear to have overlooked. A great mechanical invention implies a high intellect and great skill in the inventor. And the very principle that leads us to this conclusion among the works of men, leads us also to a belief in a great

First Cause among the works of nature. So far our reasoning is safe, because it is natural and in true analogy with our experience.

A very child in mechanical knowledge might imagine some combination of wheels which would shew us recurring numbers, and at the end of ten million turns would shew them in a new order. The great merit of Mr. Babbage was not in any first, simple conception of this kind; but in contriving a mechanism to evolve numerical results of almost incredible complexity, and to abridge the labours of scientific men, by putting tangibly before them results that were known to them before only under the form of untranslated mathematical symbols. The common sliding-rule is a machine of the same kind, though of incomparably less power. But, after all, a calculating machine produces only recurring numbers: and what light can recurring numbers throw upon the commencement of life—the passage of inorganic into organic—the transmutation of Species—or the passage of a Beast into a Man? Besides, were all this granted, where is there any show of evidence that there does exist, within the organic mechanism of the world, a prospective material contrivance for the shifting of one Order of animals into another?

A material Pantheist may tell us of the mechanical evolution of one Species from another, till he finally pretends to evolve a being like Man, whom he blasphemously calls a God. But in every step of this ideal advance he leaves out the contriving mind that is exterior to the mechanism; and he thereby virtually leaves out of sight the highest principles of his own rational nature; and his ideal progress is out of all analogy and harmony with the knowledge of experience. Has Mr. Babbage, or any other philosophical mechanist, contrived a set of wheels and axles which shall, by their own inherent powers of rotation, evolve and put together another set of wheels and axles, and thereby produce another machine of still higher inherent power? The very conception of such a machine is out of the reach of the mind of man. As a matter of fact, Mr. Babbage is now employed in completing a new design for a calculating machine of much higher powers than belong to the one he first designed and in part constructed. From the mechanical works of man, feeble and imperfect as they are, we can rise to a conception of design in the grand mechanism of the natural world; and whenever, in this train of thought, we are led to the contemplation of a new set of organic phenomena, we are also led, by a just analogy, to the conception of a new creative act by the Author of organic nature.

But our objections rest not here. It is only among things of like kind that we can institute true mechanical comparisons. One machine may imitate another, and in a mechanism of our own contrivance we may imitate a mechanism working naturally within the framework of our bodies. But mechanism is not all in all, and explains not our animal sensations and volitions. Still less can any material mechanism throw light upon our moral and intellectual conceptions—such as law, and conscience, and duty—our sense of right and wrong—our apprehensions of eternity, and our hopes of future good? What has dead material mechanism to do with thoughts such as these? Yet are they, by God's law, bound up in personal consciousness within the framework of our bodies. Of all the material illustrations of our Author's work, the most worthless inconsequential and absurd, are, I think, those he professes to draw from the calculating machine of Mr. Babbage.

§ 10. *On the Ideal Theory of Locke—imperfections of his Analysis. Schools of the Idealist and the Sensualist. Mischief of setting up Idealism as the interpreter of material nature, illustrated by the works of Oken, &c.*

I have endeavoured, in the following Discourse*, to point out some of the imperfections in the great Essay of Locke on the Human Understanding. We readily admit that there is, in the uninformed mind, no innate knowledge of external nature, and no innate universal propositions expressing human judgments anterior to all acquired knowledge. But there are born with us many well-defined, inherent principles and capacities whereby, in every human being of sound mind, knowledge resolves itself into certain forms of thought, and certain natural judgments of things without us: and these forms of thought are as much a part of our nature as our conceptions from the sense of sight. The mind of man, in the reception of its first elements of knowledge, cannot with any truth be likened (as has been done by Locke) to a sheet of blank paper. The analogy would be far more true were the mind of man likened to a sheet of paper, prepared by chemical skill, which shews some picture or design the moment the light is made to shine upon it.

---

* Infra, pp. 45—56.

Neither do I believe in the "ideal theory" of Locke, if by these words he meant anything beyond the first natural perceptions we derive from the impressions on our senses. With the exception of the sense of sight, there is nothing like an intervening picture between any object that impresses our senses and the first conceptions we form of it. And in the sense of sight, the picture on the expanded filaments of the optic nerve is nothing more than a material impression on the organ subservient to the sense: and there is no intervening idea, or form, between that impression and the first perceptions we derive from the sense of sight. Our first perceptions derived through the senses are our first ideas. Neither is it, I believe, true that the mind is really passive in the acquisition of its first sensual perceptions or ideas. From first to last the mind is active, though acting in subordination to the rigid laws of nature. Neither is there any truth in the "ideal theory," in the sense in which these words have been so often used; nor can the mind in any parts of its progress, from the first glimmerings of its knowledge, be compared, with a show of truth, to a dead sheet of blank paper on which ideas are traced, independently of the mind itself, by the hand of nature.

On these questions we owe, I think, a very deep debt of gratitude to the common-sense metaphysical school of Scotland*.

I know, full well, the imperfection and feebleness of the metaphysical parts of the following Discourse; and to any academic reader who wishes to follow out the subjects I have hardly touched on, I would recommend the critical discussion of Locke's Essay in the Lectures of Victor Cousin; which may perhaps be used both as a guide and a safeguard, should he wish to pass onwards to the higher transcendental speculations of the German school†. The works of this writer have, by some men, been sneered at and undervalued because they are critical and eclectic. But this may be, and often is, a first-rate merit. There can be no end to the motley forms of science if every succeeding author is to give us a new system. Because we reject some part of the scheme of Locke, or think that the common-sense, inductive school of Scotland has fallen short of a perfect system:—because we think that the idealism of the German school may have been pushed too far, by shutting from our view the true foundations of that great mass of material knowledge which rests on the evidence of our senses, and is, therefore, fundamentally empirical or sensual:—because we believe all this, it follows not that we are to deny the good that is already done, or to close our eyes to the great truths that have been in part unfolded. No system of psychology has perhaps yet been published, or ever will be published, in such a form as to contain the whole essence of metaphysical truth.

---

* Brown contends—that Locke has been misunderstood—that by the word *idea* he never meant to affirm that there was, except perhaps in the sense of sight, a real picture or image between an external object and the percipient mind—that he only used the word *idea* figuratively; his language being that in current use, and tinged, sometimes unconsciously to himself, by opinions (not his own) of the philosophers who had gone before him. Cousin takes a contrary view. The discussion of this point is of no importance to my present purpose: but I may state, by the way, that Locke has often expressed himself ambiguously and incautiously, if he did not hold the views attributed to him by Reid and Cousin.

† *L'Histoire de la Philosophie*, Vol. II. Lecture VI. to Lecture XXV. Paris, Edition 1829.

When I addressed the members of Trinity College at the Annual Commemoration of 1832, I had not read the Lectures of Professor Cousin, and I hardly knew his work by name: but the following sentence (from the conclusion of his twenty-second Lecture) contains a kind of summary of his views, and expresses very simply some of the truths shadowed forth in the following Discourse. "*Il n'y a pas d'idées innées, il n'y a pas de propositions innées, attendu qu'il n'y a ni idées ni propositions réellement existantes; et encore, il n'y a pas d'idées et de propositions générales, universellement et primitivement admises sous la forme d'idées et de propositions générales; mais il est certain que l'entendement de tous les hommes est gros en quelque sorte de jugemens naturels, et que l'on peut dire innés, en ce sens qu'ils sont le développement primitif, universel et nécessaire de l'entendement humain.*"

We all admit the comprehensive truth of the old adage as applied to material science, *Nihil in intellectu quod non prius in sensu.* Experience is the beginning and occasion of all knowledge: but it is not knowledge before it has been moulded into a new and better form by the innate powers of the mind itself. The adage taken in its nakedness tells us but half the truth. To give it its full meaning we must add another clause, first given to it by Leibnitz, and it then stands as follows, and is pregnant with truth and meaning: *Nihil est in intellectu quod non prius in sensu præter intellectum ipsum.* The very knowledge we first acquire by experience, forces us, by a true logical necessity, towards a contemplation of certain indwelling faculties of the mind which must exist before all experience; and without which (as is well observed by Kant and Coleridge, and the whole modern school of Idealists,) experience itself would be impossible.

In the following extract Professor Cousin describes, in very clear terms, the difference between the two opposed schools of psychology (the idealist and the sensual or empirical); and at the same time indicates the weak points of both:—"*En général, l'idéalisme néglige plus ou moins la question de l'origine des idées, et ne les envisage guère que dans leurs caractères actuels. Se plaçant d'abord au faîte de l'entendement développé comme il l'est aujourd'hui, il n'en recherche pas les acquisitions successives et le développement historique .... il part de la raison et non de l'expérience. Locke, au contraire, préoccupé de la question de l'origine des idées, en néglige les charactères actuels, confond leur condition chronologique avec leur fondement logique, et la puissance de la raison avec celle de l'experience, qui la précède et la guide, mais ne la constitue pas.—L'expérience, mise à sa juste place,* *est la condition, non le fondement de la connaissance. Va-t-elle plus loin, et prétend-elle constituer toute la connaissance? Ce n'est plus alors q'un système, un système incomplet, exclusif, vicieux; c'est l'empirisme. ou l'opposé de l'idéalisme.*" He then tells us wherein lie the weak points of idealism: "*C'est l'exagération de la puissance propre de la raison; l'usurpation de la raison sur l'expérience; la destruction ou l'oubli de la condition chronologique et expérimentale de la connaissance, dans la préoccupation exclusive de ses principes logiques et rationnels*[*]," &c.

On Locke's system, all ideas and all knowledge spring only from sensation and reflexion. It is true that many ideas take their rise in sensation; but it is not true that these ideas, as they exist in the mind, even in their first elements, derive their forms only from sensation; for they are accompanied by certain judgments that belong not to merely sensual impressions.

Again, some may perhaps contend, that by the word *reflexion* we are to understand all the inner powers and capacities of the mind, whereby it moulds into shape the first materials of thought, and thence rises to the highest forms of general truth. By such a use of the word *reflexion* we might indeed bring the two schools (the ideal and the sensual) more nearly into a verbal agreement: but while there is a difference in principle, a mere verbal agreement is worse than nothing. If it be true, that although our knowledge begins with experience, its after form and type does not spring from experience, but from certain innate powers of the mind, which work on the first materials of thought and mould them into a shape bearing no resemblance to mere sensual experience—then to include all these inner powers and acts of the mind under the word *reflexion* (in the sense in which the word *reflexion* is used by Locke) is only to stop short in our intellectual analysis, and to stifle all inquiry into the real history and workings of the human mind. It neither tells us what knowledge is, nor how the mind becomes stored with it.

---

[*] *L'Histoire de la Philosophie*, Vol. II. end of Lecture XVII. It is a very extensive work; but the discussions on Locke's Essay occupy only a part of one volume. They may be read in a translation (by Dr C. S. Henry, of the United States) entitled *Elements of Psychology by Victor Cousin*, to which are added some very good explanatory notes. This translation is now, I believe, a text-book in some of the Colleges in North America.

To shut out from thought all the innate powers and capacities of the mind, and then to deduce all knowledge from sensation and reflexion, is a large advance towards a sensual and material philosophy; but Locke was not a Materialist. How far he is to be blamed for the mischievous conclusions men have professed (it may be erroneously) to build upon his system, I do not pretend to say. But, as a matter of history, this at least is true—that many were misled by the imperfection of his analysis and the ambiguity of his language, and, above all, by his one-sided discussions on innate ideas:—and that, pretending at least to build upon his system, they learned at length to resolve all knowledge into sensation: and thus became established an empirical or sensual school, which led the way to a rank materialism.

One extreme naturally begets another. The extravagant *materialism* of some of the followers of Locke produced, perhaps, the extravagant *idealism* of Berkeley, who denied the material existence of the external world. The *idealism* of Kant and his followers of the German school was, in its first conception, incomparably more rational and noble than that of Berkeley. But it was soon followed by one transcendental flight after another, till it soared far out of sight of all the helps and suggestions of experimental knowledge*.

The highest material truths derive their form from the mind itself. Therefore, says the modern Idealist, it is in the pure reason that we are to seek for the foundations of all knowledge; and thus may we become almost free from the drudgery and toil of experimental labour. On this system the experimenter, it should seem, is to be instructed in his highest principles, and to be taught, by one who soars above the earth into the regions of pure reason, how he is to reach his highest conclusions, without the labour of experiment; and all the truths of nature are at length to be evolved from their inborn *archetype* in the mind of man. Pushed to its extreme consequences, this scheme ends in ideal Pantheism.

Such are the extravagances of the mind of man when left to its untamed licentious movements.—On one side a sensual philosophy leading to the rankest Materialism, and ending in material Pantheism;—on the other, an Idealism, ending in practical opinions not less destructive of the higher interests of the human family, and in a rejection of those very principles which are the necessary foundation of all material knowledge.

---

* There is an excellent and condensed view of some of the positions of this Transcendental Philosophy in a paper by the Master of Trinity College, read before the Cambridge Philosophical Society (Nov. 13, 1848. See *Transactions Cam. Phil. Soc.* Vol. VIII. Part V.)

Our conception of a law of gravitation is, no doubt, so far ideal that it is gained by an ideal act of the mind. But how is it gained? Not by a flash of ideal inspiration, unguided and unsuggested by experience; but by observation upon observation, and by experiment upon experiment, gradually suggesting to the mind one of the forms of general truth. It is by an inductive effort of the mind that our knowledge, which is experimental and particular, is made to pass into the form of knowledge which is ideal and general. But this ideal and general form of truth never could have had any being without a previous knowledge that is sensual and experimental. Neither can this ideal knowledge ever become independent of the experimental. For after we have evolved from the mind what we suppose an ideal truth (expressed in a formal proposition that defines a supposed material law), we are bound to test it, again and again, by new experiments: and should these new experiments fail in their aim, then our ideal truth breaks down, and either loses its very being as a natural truth, or must be so modified in form as to comprehend within itself all the facts of our last experiments. To assume that we can evolve from the mind the general truths of material science without experiment, is to desert the plain beaten road of inductive truth, and to seek our way in an impenetrable wilderness.

A general would be mad, were he to mount his artillery on an air-balloon. A miller would be mad, were he to set his machinery in movement, and pretend to grind flour for the food of man, without a supply of corn for the operation of his mill. A manufacturer would be mad, who should pretend to make some fabric for our use by the mere rotation of his mechanism, and without supplying it with any of the raw material on which his mechanism is to do its work. And not one jot less mad is the transcendental Idealist who pretends to work out the general truths of physical science without an experimental appeal to nature, and without first resting on its evidence.

Few Englishmen have offended in this way. Their madness has run more in the sensual stream ; but there are some signs among us of this kind of ideal lunacy; and the translation of the Physio Philosophy of Oken, and its publication by the Ray Society, is one plain symptom of the malady. The great radical fault of his Philosophy is—that it gives the logic of induction to the winds—that it overlooks (or seems to overlook) those very means and methods by which, since the days of Galileo, the fabric of material knowledge has been so nobly and so firmly reared. The author plunges at once, and with hearty faith, into the transcendental speculations of Idealism, and begins his system with a string of propositions that have not one glimmering of meaning without an assumption of principles which as yet have hardly found an entrance into the sober minds of Englishmen.

No doubt there are many natural analogies which a laborious experimenter may overlook; and no one can tell, without trial, which of them is, or is not, important. Hence it is not only bad taste, but very bad philosophy, to laugh down a scheme of Nature (such, for example, as the Circular System), merely because it comes not within our preconceived views of a natural arrangement. Every scheme that professes to build on facts, deserves to be severely tested and examined. Again, such are the riches of Nature, that a man, who at first sight seems only to be indulging his imagination, may strike on some new mine of thought that may be of inestimable worth, if he condescend to follow out his views in the honest spirit of an experimentalist. Kepler was a man of this kind. The *principle of causality* was strong within him; and he had a firm faith in the universal harmonies of Nature. Hence he was led to great discoveries, though, in their specific direction, his first views were guided by a false analogy. At the same time he was a laborious and never-tired observer and experimenter: and the love of law and of material harmonies led him onwards, in good hope, to very great material discoveries. But he did not torture his discoveries to make them bend to his first ideal notions; but he made his ideal notions bend to his discoveries, which he announced in the simple form of material inductive truths. And let no man be led astray by his history, who has not the same temper and the same simple love of truth. If an imagination, like that of Kepler, have led to nature's secrets, because it was tempered by a willing submission to experimental evidence, let us remember, at the same time, that a rash spirit of generalization is one of the marks of ignorance, and that premature theory has too often clogged the progress of physical truth. Of all material sciences, Geology offers perhaps the wildest field for speculation; yet, in its true history and progress, no science is more practical and inductive. I believe that the premature theories of Werner's school retarded its progress by more than twenty years.

A philosophy to be useful should, above all things, be clear in its first principles; but in the work of Oken, principles are set forth as if they were axioms, which are one, almost unmixed, compound of wild, unintelligible extravagance. I have done my best to find some of the principles of sound reason in his fundamental propositions. He tells us, in the first page of his Work, "that Physio-Philosophy has to shew how, and in accordance with what laws, the Material took its origin; and therefore how something derived its origin from nothing." Woe betide all human philosophy, if such is to be its beginning and its aim! I have read his Work, and I have striven to perceive some glimmerings of steady light among the mists of his first sixty or seventy pages; and nothing have I seen but an *ignis fatuus* playing, here and there, on a darkness that is palpable and impenetrable.

I complain also of the intolerable dogmatism of his Philosophy. Among his most doubtful propositions I find not a syllable of doubt or hesitation. Nor is this all. He is not merely unintelligible, it may sometimes be, from clothing his meaning in words derived from a psychological theory, ill comprehended by his reader; but he is often untrue to Nature in the assertion of material facts, about which any man of common sense may judge, if he but choose to use his senses. Some pages I may not have comprehended, because I am not one of the initiated in the mysteries of transcendental philosophy. But there are points in Oken's volume on which I dare to give a very positive opinion. All his pages on the structure of the Earth give us little more than a compound mass of error, involved in a succession of assertions poured out with the utmost dogmatism, and without one syllable of reserve. Almost everything that he tells us of Geology, and much that he tells us of Mineralogy, must come under this unmitigated censure. His Geology is false to Nature in its beginning, and its middle, and its end*.

But it is said that there is a proof of great knowledge in the works of Oken, and many bright original ideas, which may be, and have been, carried out in the illustration of dark and difficult questions of comparative anatomy and physiology. One who aims at everything must needs hit something, and I believe it true that he has done good service; nor would any one grudge him his honour for all that he has done in the cause of science; at least, those parts of science which he has studied practically and knows experimentally. His fault is—that after experimental studies of the sternest kind, after amassing knowledge, from observation, with no common skill; and after exhibiting in his own person that kind of philosophical inspiration which loves to soar from physical facts to physical theories—from particular to general truths; he then chooses to turn round upon us and to deny the nature of his own material fabric; and to teach us, only through the mists of Idealism, that very knowledge which he had gained as an experimentalist, or learned from the experimental knowledge of other men, and which he never could have gained by any other method.

---

* See Supplement to the Appendix, No. VIII.

The general truths of physics are, it may be said, the ideal forms of material truths made out by observation and experiment. But what becomes of any general truth if the foundation of experiment be away? It is then but a castle in the air. True physical induction implies a previous series of consistent observations or experiments; and so far must we range ourselves with the Sensualist. But the verbal expression of a law, and the inductive power by which we ascend to the general conception of the law, is an act of a different kind, and brings us to the side of the Idealist: but if we choose to remain there, then must there soon be an end of all farther physical progress. Great *deductive truths* have, no doubt, been brought to light by pure reason from well established laws of nature; but such truths have their limit, and deal only with the consequences which follow of necessity from laws already known; but if we wish for a wider grasp of material nature and to rise higher than we have yet done, we must again become the pupils of the empirical school. We must quit our high position, and again condescend to make experiments; which may perhaps only strengthen the position we had already gained; or may give us a better insight into the universal harmonies of nature, and a conception of higher laws than those which could be expressed under the former condition of our knowledge.

§ 11. *Digression on some Discoveries of Oken followed out by Owen.—Archetype of Nature—General Scale of Nature. Never existed at one time in the History of the Earth. The reconstruction of the Scale subversive of the Theory of Development, &c.*

The translation of the Physio-Philosophy of Oken, and the recent publications of Professor Owen, impose on me the necessity of detaining the reader with a short digression on the discoveries of these two great physiologists, so far as they have any bearing on the discussions of this Preface*.

All animated nature is formed on a plan, and every new discovery gives but a fuller proof of this great admitted truth. Now in any Division of the animal kingdom is there an *archetype*, or ideal form, to which all other animal forms of the same Class are subordinate? This is a fair inductive question, suggested by the pregnant facts of nature; and it can be answered only by the inductive method. The question never could have entered into the mind of man had it not been first suggested by the facts of nature; and it never could have been answered without continued and patient observation.

---

* Other names should be mentioned were I to attempt any thing like a history of these discoveries: but my only wish is, that my sketch may be understood; and I profess not to state facts in their full or historical order.

In every vertebrate animal there is (as the name implies) a back-bone made up of many parts that are closely joined together. Every joint of this back-bone has a cylindrical or central portion, which helps to give rigidity to the body and support to the limbs, and has many other important offices in the animal economy. On the upper part of these several cylinders are certain projecting bones (called *processes* or *apophyses*) that unite together, and form a protection to the great nervous chord which descends down the back: and on a lower part are also similar *processes*, which cover the great descending artery and other vital organs of the body. Now if we examine the several joints of the back-bone of any vertebrate animal, from the top of the neck to the end of the tail, we find that, however different they may be in form and in apparent office, they are made up of homologous parts—that is, of parts which tally one to another, and may be described by common names. In the neck we find not ribs; but we do find the rudiments of ribs. The neck requires free motion, and would be injured in its movements by a stiff collar of ribs. In the back the lower bony *processes* of the cylindrical joints are elongated into ribs, which are united in front by the sternal bones, and thus form a kind of hollow bony cylinder for the protection of the heart and lungs, and the great descending arteries. In the loins, the ribs or lower *processes* again become degenerate, and again allow a more free movement to the body. In the haunches these lower *processes* of the back become once more confluent with bones that form a cylindrical covering for the softer vessels, and offer a strong fulcrum for the lower limbs. In the tail we find not ribs; but we do find a set of lower *processes* that embrace certain blood-vessels, and, however different in form, are strictly homologous to the ribs. For if we take one joint of the tail, and, in the same skeleton, compare it with a joint of the back united to its ribs and sternal bones (or cartilages), we find on this comparison that the several parts of the two joints are so strictly homologous that they tally one by one, and that an anatomist can describe them by common typical names. But how have these analogies been made out? Not by mere theory, nor by any ideal scheme of nature unsuggested by experiment. The facts I have stated were made out in the way of honest and laborious induction. The structure of the backbone, and the general analogies of its parts, were assuredly well known to Oken, before he published his original views respecting the typical relations of the skull to the other parts of the skeleton, or advanced a step beyond the anatomists who went before him.

Let us now pass on to the cranium of the same skeleton. It is joined to the back-bone as if it were but another vertebra, and it performs one of the important offices of a vertebra; for the spinal chord passes within it, and is surrounded by it. But the spinal chord now becomes expanded into that spherical mass we call the brain; and the bony envelope, corresponding with it, seems to lose all appearance of vertebral appendages, and to pass into that great spherical mass of bone we call the skull. The skull, however, is made up of many parts that may be separated one from another; and may not these several parts be so arranged as to tally naturally, one by one, with the central cylinder and the *processes* of a single vertebra, or of more than one? This seems to be a very natural inductive question: and thousands may have proposed it to themselves in thought, though they saw not their way to its true answer. Oken, in whom the inductive power was strong, and who was well skilled in the analogies of the vertebrate skeleton, went far towards a right solution of the previous anatomical question. Owen, following in his leader's track (for in this question Oken was his leader), has, in the opinion of our best anatomists, now resolved our doubts, and shewn that in the whole vertebrate Sub-Kingdom (from the lowest type in Fishes, to the highest type in Man), the cranium is made up of parts corresponding to four vertebræ; and that these cranial parts tally, one by one, with the corresponding parts of a true typical vertebra.—Nay, he has gone farther still: for by following in the same inductive train, and not in one step guided by any theory that was not suggested by known facts, and comparing experimentally one part of nature with another, he has endeavoured to eliminate the true rational *archetype* of every vertebrate skeleton of whatsoever Class.

An Idealist may perhaps tell us by what powers of reason this long inductive train of thought was brought to its accomplishment: and it would be great blindness for any one to deny the part performed by pure reason in the ideal construction of an *archetype*. The *archetype* is but the creature of reason; but let us not therefore be told that it is from pure reason we are to seek for physical truth, *à priori*, and not by the help of our senses, guided and urged on by the inductive instinct. If we are to seek for practical wisdom, we must be first guided by the experience of those who have gone before us; and if we gain strength by the labour of treading in their steps, it may be our high privilege to advance somewhat farther than they have done. But we only mistify ourselves, and those around us, if we think to explain the secrets of nature by the oracles of pure reason untutored by experience. To deny the reality of knowledge derived inductively from the senses, is utterly to deny our nature: and we do not exalt pure reason, but degrade it, and make it worthless and impotent, if we deprive it of experience, which is both its guide and minister*.

---

* In this, and the preceding section, I have endeavoured to shew that the physiological discoveries of Oken are not ideal or transcendental, but strictly inductive. The same opinion is well given by M. Jobert, in his *Outlines of a New System of Philosophy*, (London, 1848, 1849), as will appear from the following extract:—"However great was the merit of this

I have done my best to explain, with as little use of technical language as possible, the general views of Oken and Owen. They elevate our conceptions of Creative Wisdom; for they bring under the domain of law what was before less perfectly comprehended in it. All the former proofs of design, so far as they were clearly seen and unfolded, they have left exactly where they were before. The eye has the same adaptation to the vibrations of light, and the ear to the pulsations of the air, whatsoever may be the homologies of the skeleton. But these new discoveries do add very greatly

---

discovery (viz. of the cranial homologies), which according to Professor Owen, would, alone, have conferred immortality on the name of Oken; it is to be wondered how philosophers can have been deluded into the belief that it was an idea *à priori*, whilst the whole process of deductive argumentation is most evident in the *naïve* narration of the author himself. First, he *sees* a bleached skull; then, he regards it intensely; and, now, he perceives that it is composed of parts. A man who had never seen a vertebra, or a series of vertebræ, or even a common anatomist, could not have guessed a possible relation of similarity between this head and a vertebral column. But Lorenz Oken, a man of genius, a great *comparative* anatomist, who has spent part of his life in seeing and handling vertebræ, after seeing, picking up, turning round, and regarding intensely something, which reminds him of another thing that he has very often seen before, *immediately* thinks that it is like a vertebral column, and concludes that all the heads he has seen, and which he could ever see, must be composed of parts whose type is the vertebra. All this is very natural as a pure process of induction from facts previously observed. There is nothing *à priori* or mysterious in it, for, since the idea struck him only *after* he had picked up the skull and regarded it intensely, I cannot see how any argument could be drawn from this in favour of the doctrine, that great *generalizations* are necessary truths, *which cannot be learnt from experience*." (p. 55—63.) I cannot, in a note like this, give any general criticism of a work, which concisely touches nearly all the disputed points of Psychology. But I may remark, by the way, that it is short, clear, and logical, and written in good and forcible English:—a fact that is truly astonishing when we learn that the Author, but a few years since, came into this country, when he was not able to speak a syllable of our language. Before he came to this country he was, however, well known in France, by his published works, as a man of science.

to the proofs of design, by giving us new proofs of adaptation. For if there be a well-understood plan in nature, and if in all parts of the animal kingdom that plan or *archetype* be so modified as to become adapted to peculiar wants and conditions—then is that very modification in itself a sure indication of design; and we may give a great extension to that kind of argument which I have endeavoured to exemplify in one of the notes of the Appendix*.

These general views help us also to explain and rationalize certain well-known phenomena, such as abortive or rudimentary organs. These organs may have a muscular use which in some cases we do not comprehend However this may be, they form a part, and an essential part, of a great scheme; and they help us to understand the pattern of nature's workmanship. One use, at least, they have; they tend to complete the order and plan of nature: and this, moreover, we may venture to affirm, that the Author of Nature manifests, in examples without number, a love of order and harmony and beauty, which is altogether independent of our conceptions of mere vulgar use.

But what is to be the effect of these discoveries on our previous discussions on animal development and transmutation? They may, perhaps, help to give us a more philosophical and natural arrangement of the animal kingdom; but they give us no help in discussing any question on the origin of life, or on the transmutation of one Species into another. These questions belong, first of all, to fact, and not to theory. The proper business of science is with second causes; and we admit not Specific Transmutations among acknowledged second causes. And as for the origin of life, or the first origin of any connected series of natural phenomena, we believe the discussion is out of the province of inductive science; for however high it may ascend from the sensual into the ideal, it dares not to start with the ideal; and (unlike the Physio-Philosophy of Oken) it presumes not to tell us "how something derived its existence out of nothing!" The early parts of this Preface were written before I had read the Physio-Philosophy of Oken, or the several works of Owen, to which I have here referred*. I have read them now; and in revising the early parts of this Preface, during its progress through the press, I have not, in consequence of these new lights, been compelled to change one word of what was written.

---

* Appendix, note F. *infra*, p. 143.

"To what natural or secondary causes the orderly succession and progression of such organic phenomena may have been committed, we as yet are ignorant. But if, without derogation to the Divine power, we may conceive the existence of such ministers, and personify them by the term 'Nature,' we learn from the past history of our globe that she had advanced with slow and stately steps, guided by the archetypal light, amidst the wreck of worlds, from the first embodiment of the Vertebrate idea under its old Ichthyic vestment, until it became arranged in the glorious garb of the human form*."

---

* *Physio-Philosophy of Oken*. *Archetype and Homologies of the Vertebrate Skeleton*. Owen, 1848. *Discourse on the Nature of Limbs*. Owen, 1849.

Had I not known the opinions of this great comparative anatomist, as they are expressed in many of his recent works, I should, perhaps, have thought that in this passage he meant to indicate some theoretical law of generative development from one animal type to another along the whole ascending scale of Nature. But such is not the opinion to which he would give the sanction of his name.

An historical development, as a matter of fact, is one thing—a development by natural law, or by second causes we can comprehend, is another. There is no material law to explain the beginning of life, sensation, and volition. And were such phenomena begun, and so far under our control as to fall in with our conceptions of a material law, and were capable of being reproduced experimentally, still there would not be the semblance of any generative law to explain the passage of one organic Order or organic Class into another.

Natural philosophy deals only, I repeat, with second causes. The beginning of any one of Nature's laws belongs not to the province of man's contemplation, except so far as it is a question of mere history based on observed facts, and not upon *à priori* reasoning. Not only are we "as yet ignorant," but we ever must be ignorant, of those hidden causes which moved the Creative Will to exercise or to control its creative power. On the waxen wings of sense it has not been given us to soar thus high.

---

* Owen, *On the Nature of Limbs*, p. 86.

If there be an *archetype* in the Vertebrate Division of animated nature, we may well ask whether there may not be a more general *archetype* that runs through the whole kingdom of the living world. In a certain sense there is. All animals, if we except the *Radiata* which come close to a Vegetable type, are bilateral and symmetrical, have double organs of sense, and have a nervous and vascular system with many parts in very near homology, even when we put, side by side, for comparison, the animal forms taken from the opposite extremes of Nature's scale. And even among the *Radiata*, where we, at first sight, seem to lose all traces of the vertebrate type, many of the Genera, on a better examination, are proved still to be bilateral and symmetrical*.

In every successive *Fauna* of Geology we find the same kind of animal subordination we meet with now in the living world; and the very earliest Genera and Orders were not organically inferior to the Genera and Orders of this day which we derive from corresponding grades in the scale of Nature. Nay, sometimes the primeval Genera and Orders are organically superior to their corresponding types in the living world. Again, the general organic plan of Nature has been at all times not merely analogous, but identical. If Genera, Orders, and Classes be now distinct and separate, they were equally distinct and separate in all periods of the old world. There is no development on the lines of organic ascent such as to produce confusion: but if the *theory of development* were true, there must be, on some parts of the organic scale, such a blending and penetration of types as would blot out and obliterate our lines of separation between Genera and Orders and Classes. But we look in vain for any semblance of such obliteration: and if we try to complete our present scale, by interpolating within it the organic types of the old world, we find no incongruity in our task. The oldest types fall into their place in the general scale, as naturally as the newest. We may, by this interpolation, improve and perfect our general scale; but we break not down the barriers between Genera and Orders and Classes. They continue as strong and as abruptly marked as they were before.

---

* I here refer to the descriptions of Echinoderms and Corals, by Professors Agassiz and Dana; and, I may add, to the arrangement of the Corals in the Woodwardian Museum by Mr. M'Coy.

The elevation of the *Fauna* of successive periods was not therefose made by transmutation, but by creative additions; and it is by watching these additions that we get some insight into Nature's true historical progress. Judging by our evidence (and by what else have we any right to judge?) there was a time when *Cephalopoda* were the highest types of animal life. They were then the *Primates* of this world; and, corresponding to their office and position, some of them were of noble structure and gigantic size. But these creatures were degraded from their rank at the head of Nature, and Fishes next took the lead: and they did not rise up in Nature in some degenerate form, as if they were but the transmuted progeny of the *Cephalopoda;* but they started into life (if we are to trust our evidence) in the very highest ichthyic type that ever was created. Following our history chronologically, Reptiles next took the lead at the head of Nature—not by transmutation, but by creative addition—and (with some almost evanescent exceptions) they flourished during the countless ages of the Secondary Period as the lords and despots of the world; and they had an organic perfection corresponding to their exalted rank in Nature's kingdom; for their highest Orders were not merely great in strength and stature, but were anatomically raised far above any forms of the Reptile Class now living in the world. We have seen, however, that this Class was, in its turn, to lose its rank at the head of Nature; and what is more, we have seen that it underwent (when considered collectively) a positive organic degradation before the end of the Secondary Period, and (if we may trust our evidence) this took place countless ages before terrestrial Mammals of any living type had been called into being. Mammals were added next (near the commencement of the Tertiary Period), and seem to have been added suddenly. Some of the early extinct forms of this Class, which we now know only by ransacking the ancient catacombs of Nature, were powerful and gigantic; and we believe they were collectively well fitted for the place they filled. But they, in their turn, were to be degraded from their place at the head of Nature; and she became what she now is, by the addition of Man. By this last addition she is more exalted than she was before. Man stands by himself the despotic lord of the living world: not so great in organic strength as many of the despots that went before him in Nature's chronicle, but raised far above them all by a higher development of the brain—by a framework that fits him for the operations of mechanical skill—by superadded reason—by a social instinct of combination—by a prescience that tells him to act prospectively—by a conscience that makes him amenable to law—by conceptions that transcend the narrow limits of his vision—by hopes that have no full fruition here—by an inborn capacity of rising from individual facts to the apprehension of general laws—by a conception of a Cause for all the phenomena of sense—and by a consequent belief in a God of Nature.

Such is the history of Creation. It is not the dream of a disordered fancy, but an honest record of successive facts that were stamped by Nature's hand on the chronicle of the material world. Where our chronicle is broken and defective, we may acknowledge our ignorance and be silent; or we may speculate analogically on points where true historical evidence is wanting. We may, in part at least, endeavour to explain what is unknown by what is known; for we believe that Nature has been consistent with herself. We are certain that there have been great successive changes in the surface of the earth—that some of these changes were slow and gradual—that others were brought about by the sudden eruption of the pent-up powers of Nature, and were comparatively rapid and violent. But each change was in subordination to the general laws of material Nature, and was, we believe, but a prelude to the material conditions which followed, till physical Nature became what she now is. We also believe that the successive creations of the organic kingdoms were in harmony with these physical changes in the surface of the Earth—and that the Fauna of each period formed a kind of prelude to the Fauna that was to follow, till living Nature became what she now is. Nay, we can sometimes discern this kind of organic relationship or analogy, not merely in a broad statement of facts (like some of those above enumerated), but in a closer comparison of the Genera and Orders that enter into the *Fauna* of two successive periods. Thus the gigantic Edentata (the Glyptodons and Mylodons, &c.) in the superficial drift of South America, formed a prelude to the part taken up, in our days, by the burrowing Armadillos and the climbing Sloths; and the gigantic Marsupials in the caverns of New Holland have a like relation to the Kangaroos now bounding on the surface of the country. But, while we admit all this, we are not so mad as to affirm that the giants of the former period were the natural progenitors of their dwarfish representatives in the living world. What we do believe is, that the past history of Nature, as it is seen in her Geological records, though strange and altogether unanticipated in the speculations of human reason, is consistent and coherent; and that, before the creation of all worlds, there was an *archetype* of Nature (dead as well as living, past as well as present) in the prescient mind of God.

Independently of any evidence we derive from palæontology, a conception of this kind is so grateful to the imagination, and is so obviously suggested by the clear gradations of living nature, that an ideal organic scale has, for ages past, been a subject of speculation. I profess not to trace its history: but Dr. Johnson tells us that it took its rise among the Oriental metaphysicians and physiologists. In the former half of last century it was a favourite theme with our moralists and poets. It was adorned by the beautiful prose of Addison, and the glittering poetry of Pope; and it was tortured into the service of infidelity by Bolingbroke. Lastly, it was taken up by Soame Jenyns in his acute and elegant, but very unsatisfactory *Inquiry into the Nature and Origin of Evil*. But the links of his ideal chain of nature were snapped asunder, and its fragments were crushed to atoms by the weighty and indignant criticism of Johnson*.

In the hypothetical scheme of the Authors just alluded to, "the Universe is a system whose very essence consists in subordination—a scale of beings descending by insensible degrees, from infinite perfection to absolute nothing; in which, though we may justly expect to find perfection in the whole, could we possibly comprehend it; yet would it be the highest absurdity to hope for it in all its parts, because the beauty and happiness of the whole depend altogether on the just inferiority of its parts," &c. ...... "It is moreover highly probable (we are told), that there is such a connexion between all ranks and orders by subordinate degrees, that they mutually support each other's existence; and every one in its place is absolutely necessary towards sustaining the whole vast magnificent fabric." ...... "That no link in the chain can be broken," &c.

---

* Review of a *Free Inquiry into the Nature and Origin of Evil.*

Such, in a few words, is the ideal scheme of Nature; to which Johnson replies as follows: "Our discoverers tell us the Creator has made beings of all orders, and that therefore one of them must be such as man. But this system seems to be established on a concession which, if it be refused, cannot be extorted."......"It does not appear, even to the imagination, that of three orders of beings the first and third receive any advantage from the imperfection of the second, or that they may not equally exist, though the second had never been, or should cease to be; and why should that be concluded necessary which cannot be proved even to be useful?"......"The scale of existence from infinity to nothing cannot possibly have being. The highest being not infinite must be, as has been often observed, at an infinite distance below infinity" ...... "Nor is this all. In the scale, wherever it begins or ends, are infinite vacuities......So that, as far as we can judge, there may be room in the vacuity between any two steps of the scale, or between any two points in the cone of being, for infinite exertion of infinite power," &c. This reply is perfect for its purpose, and needs not perhaps the addition of a word.

But Johnson was not a great naturalist; and we now know, by a far higher evidence than had fallen under his contemplation, that there never was a scale like that above described. It never was made up of parts so mutually dependent, that one link could not exist without all the rest above it and below it. It never existed without such vacuities as cannot be filled up by the renovating operation of mere material laws; unless we cast away the lessons of inductive truth, and give to material laws a different power from what they have in Nature. Such as it is, it never existed at one time; but its successive parts were elaborated during successive times. This we have learnt from a more enlarged study of the works of Nature: but we do admit the existence of a scale of Nature—not such as was conceived by Bolingbroke, tricked out by Pope, and made the support of a moral scheme by Jenyns—but such as I have endeavoured to describe historically from the clear records of Creation.

After the criticism of Johnson the universal scale of Nature seems for a time to have been forgotten; but it is conjured up again, with new connexions and superadded links, by our material Pantheists. They give no support to their ideal chain by attaching it to the throne of God. They dare, in imagination, to thrust the God of Nature from his throne and to deify the elements; and from them only to work out all the phenomena of Nature both dead and living: and as their experience carries them upwards no farther than man, him they impudently deify. They go back to the old sensual fooleries of hero-worship, and put man in the place of God. They know Nature too well to tell us of a chain of Nature existing at one time from nothing to infinity, and with its links so bound together "that not one link can be broken without destroying the vast and magnificent fabric of Nature." But they do tell us of a scheme so knit together by material laws (and by nothing else), that every being must have passed in the way of a natural generative ascent, through every grade of an ascending scale. The ideal chain of Pope and Jenyns, and the pantheistic chain of our modern Materialists, though starting from an entirely different conception of the seat where dwells the true *archetype* of Nature, bring us nearly to the same conclusion; and the same reply may be applied to both. There is no power in Nature (if we shut out the creative power of God) to elaborate the nearest successive links of Nature's ascending chain such as we behold it. And were we (hypothetically and for the sake of argnment) to grant this power, endless vacuities would still remain that would utterly defy the efforts of any known material law, and which no power short of Creative Wisdom could supply.

But our objections end not here. If the Pantheistic scheme of development be true, every line on the great scale of Nature must be progressive. If we deny this principle we stultify the whole theory of development. On this theory we may have beings of a low order during all successive periods: but such beings must either die away from Nature, or rise by natural transmutation, like the animals before them, higher and higher still on the scale, as we pass on to successive periods. There can be no pause in a material law. Hence, on this scheme, the organic development on every line must be on the whole progressive and chronological. Now we have admitted that there has been an historical development of animated nature by creative additions, but not by natural development: for on our several lines of ascent the succession of organic types is not on a natural or chronological scale.

I am detaining the reader of this digression by statements, which, perforce, lead me into repetitions of what I have said before. But I will now affirm, once for all, that the actual and historical scale suggests not to any reasonable mind the theory of development. Take the whole scale of nature as we find it—fill it out by embodying in it every living type of nature, whether animal or vegetable—interpolate among them every dead type yet found by ransacking the catacombs of nature in all the old deposits of the earth; and give to these dead types an imaginary life. And what have we then? A grand development of nature it is true; but not a sequence that rises chronologically, or is derived from any known natural or generative law. If the Pantheistic theory of transmutation and development were true, then the whole scale, made up (so far as we can see our way) of many parallel lines of organic ascent, must of necessity be progressive; for all its parts are linked together in one natural system of transmutation to something higher. Let us then, once for all, put this theory to the test by what we may safely call the *experimenta crucis* of its truth. Begin with the lowest animals on our scale. They are not the first in age. On a scheme of material development we ought to find mountains of Corals and hard Zoophites (creatures well fitted for fossil preservation) under all other traces of animal life among our most ancient deposits: but there we find them not. Go on to a Class of Molluscs, and take the family of Brachiopoda; for they existed at Nature's dawn and they exist now; but they were larger and more noble in Nature's infancy than they are now. They flourished, and they seem to have been degraded. Along with them we find the Cephalopoda, and of these we can tell the same history. Take the whole Sub-kingdom of Molluscs, so far as it was created in the dawn of nature, and we see in it no marks of immaturity or imperfection. Next take the great complicated Class of Fishes, both of the living and the extinct world, and we find not its organic lines arranged on a scale of chronological ascent. If we seek for the crowning type of this great Class we may find it among the most ancient monuments of extinct nature. From thence we can bring it up and place it side by side, and perhaps above, the most exalted ichthyic type of the living world. Leave the Class of Fishes and pass on to the scale of Reptiles, dead and living. Is this scale chronological? Is the last collective Reptile Fauna the highest, shewing the last and best development from Nature's womb? Not so. Again, we must return to the old tombs of Nature, and thence bring back an ancient Reptile type, and put it as the true crowning type of her workmanship, and far above all the living Genera of the Class. Is this like progressive development by natural generation? Whatever ignorance may assert or pantheism may fable, I fearlessly say no. But Nature's denial is far more emphatic than the feeble words of my negation.

I now therefore take my leave of this leading inquiry of my Preface, with an apology for repetitions that were almost inevitable. I have endeavoured to make each section independent of the others, and on that account have been led, by independent points of evidence, to a repetition of similar conclusions; for I believe that few persons will read this Preface through, while many may turn over certain sections of it. I have written with earnestness and sincerity, and I have not knowingly blinked any opposing fact, or overstated a single argument. The subject is one of vast importance; for in truth it virtually involves our belief in a Creator and an overruling Providence. Let me then wind up this digression by another quotation from Dr. Johnson's admirable *Review*. "There is a degree of knowledge that will direct a man to refer all to Providence, and to acquiesce in the condition that Omniscient Goodness has determined to allot him; to consider this world as a phantom that must soon glide from before his eyes, and the distresses and vexations that encompass him, as dust scattered in his path, as a blast that chills him for a moment, and passes off for ever."

We have now reached a point from which we may again turn back to answer a former question more directly than we have yet done. What have been the conditions of mind that have led men to deny the natural evidence of a Creative Power? They have put themselves in a false position, we reply, by a misapprehension of themselves, leading them into an ideal Pantheism, or by a misapprehension of Nature, leading them into a material Pantheism. The former deifies the mind of man, the latter deifies the dead elements. Both are false, and mischievous because they are false.

True knowledge elevates the soul; Pantheism (in whatever form) withers it and degrades it: for Pantheism cuts us off from all our higher moral aspirations, and from all our innate strength:—from that principle of Causality which elevates us above the rank of beasts, because it lifts our thoughts above the material things around us; which teaches us that the sensual has its perfection in the ideal; that material law must have sprung from a personal ordaining Lawgiver; that the mind of man is not a self-existing thing, but the offspring of a supreme Creating Mind; that above all nature, dead and living, is nature's God.

Men are the fools of fashion, and schemes of development are the fashion of the hour. Constitutions, that once came to life only after long gestation and many a mortal pang, are now to be developed into full stature, while the sun is making one of its daily rounds in the sky. Law is to develope its true supremacy by the dissolution of the elements of order. Nations are to be developed into riches, power, and strength, and happiness, by the abolition of the rights of property. On a revolving mechanism, all things, once thought great and glorious, are to descend into the kennel; and out of it are to rise the elements of another system which are to be twirled and developed into something newer and more glorious.—One develops all knowledge from the mind, and laughs at the drudging materialist and experimentalist Another, bristling up and blundering among small facts, tells us that in them he finds the elements of all nature within his material ken—that he has machinery fit for all work, by which he can grind mind out of matter, rationalize the brute forms of nature, fabricate a new web of humanity, and teach us something better than Christian charity. Things most sacred are to be swept into a fashionable whirlpool, wherein the strangest incongruities are now making their gyrations side by side. One, calling himself an Idealist, makes our Religion nothing but a turn of thought evolved naturally by the mind during its whirl of development; as if the followers of Jesus had been a set of moody speculative philosophers, and not (as we know they were) a set of very simple and earnest men!—Lastly, in the same vortex, and side by side with the whirling Idealists, we see a dark being with many faces, who first proclaims himself an anti-rationalist; and to justify the symbols of this creed, becomes a vender of preposterous miracles and bygone fables; and then to bring his morality down to the level of his credulity, publishes what he believes not true, and dares to tell us afterwards, that truth is not the verbal expression of our individual belief, but the watchword of a party. And then he makes another gyration that draws him within the whirlpool of the Pantheist, and his brain turns with it; and by whatsoever name he may now pass, and whatsoever may be the last form and colour of his symbols, he is but the hierophant of Pantheism; for he sees in the simple elements of his faith, nothing but an organic germ that by a process of incubation may be hatched by man himself into a new organic type, and a higher grade of supernatural development. Where these drunken movements are to end I know not. The subject is no matter for mockery, but for solemn thought.

§ 12. *Reconsideration of the Argument for Final Causes. Miracles. Belief in a First Cause, and Moral Conclusions from it. Induction the Fountain of all material Truth, &c.*

The Rationalist, the Pantheist, and the Materialist, all take one common ground from which they start their systems.—They all refuse to admit any manifestation of a power superior to that of vulgar nature. If facts, whether historical or natural, be put before them, which seem out of the ordinary course of nature, they either shut their eyes to the facts, or tell us that "there must be some power" in common material nature capable of producing them. Their first objections are based on what they call experience; and then they reach their grand conclusion by virtually rejecting the testimony of experience. There are facts in the past history of nature, as well as in the past history of man, which are utterly beyond our ordinary experience. If this be true (and it is true), we refer such facts not to second causes within our experience, and which our experience tells us to be inadequate, but to a power above that of vulgar nature which is known only by experience;—to the will and energy of the great First Cause, who created all worlds, animate or inanimate, and ordained the laws by which they were first called into being, and are still upheld.

"Once believe that there is a God, and miracles are not incredible." These words are found in Paley's reply to an argument against miracles, which is expressed in the following proposition: "It is contrary to experience that a miracle should be true; but not contrary to experience that testimony should be false." Therefore, Hume contends, we are bound in reason to disbelieve miracles. If we deny the being of a God, then, whether this kind of reasoning be right or wrong, we must deny the truth of miracles: for a miracle presupposes a power superior to nature, and an Atheist admits no power but that of nature. If, on the other hand, we do believe in a God of nature, then can we conceive it possible, or even probable, that he should suspend what we call his laws, or manifest his power under some new form, to carry out the purposes of his will; and the question of a miracle thus becomes a question of fact to be decided on its proper evidence. This is the substance of Paley's reply, stripped of its details and illustrations*.

There are two very distinct views of miraculous power. 1st, It may be shewn in the suspension or violation of a positive law of nature, long established and comprehended by experience. Or, 2ndly, it may be shewn in a new creative act; such, for example, as the formation of a new Class of animals, which may be in strict co-ordination with the established laws of nature, and therefore, in a certain sense, may be no more miraculous than the generation of a new sentient being of a known Species. There is, however, this essential difference in the two cases. The generation of a new sentient being of an existing Species is but the continuance of a subordinate organic law of nature long since established and comprehended by experience. The commencement of animals of a new Species would be the commencement of a new set of organic laws, which afterwards might go on harmoniously, and enter into the organic constitution of animated nature. New organic beings are (on this view) like new Acts of Parliament, that become an organic part of the constitution of a State—not so much by upsetting old laws as by carrying out their spirit: and new Acts of Parliament create not themselves any more than new organic beings create themselves in the constitution of nature; both require for their existence an act of the supreme legislative authority. Thus have we an executive power in nature to carry on the laws of nature in harmonious subordination; and we have a legislative power to make new laws—to meet, we might say, the rising wants of a progressive nature. I wish not to cheat the reader by a mere analogy. I use it only to make my reasoning understood.

---

* *Evidences of Christianity*, Vol. I. pp. 1—14.

Had Hume been told of the successive forms of animal life discovered by Geologists, he ought, on his own principles, to have disbelieved the story; because it contradicts the supposed constancy in the laws of Nature, and is, therefore, contrary to experience. But in this example (derived from Geology) we are absolutely certain that his principles would have led him wrong. Let us next suppose him, by the evidence of his senses, or by any other kind of teaching, to have learnt the great palæontological facts discovered by Geologists.

What would then have been his conclusion? It is perhaps no easy matter to tell what would have been the conclusions of one who seemed to revel in doubt as if it were his natural element, and who went so far as to doubt his own existence: but, judging from his moral condition, and his apparent unwillingness or want of capacity to grasp the idea of a First Cause, he would probably have adopted, with the reserve of doubt, some theory of transmutation. But in doing this he would have utterly destroyed the foundation of his own argument against miracles: for the passage of a Fish into a Crocodile—of a Whale into an Elephant—or of a Baboon into a Man—is as perfectly contrary to vulgar experience (and therefore in Hume's sense as perfectly miraculous) as the act of making a deaf man hear, a blind man see, or giving back life to a body that is dead.

I have no wish to do battle with an Atheist; and the Author of *The Vestiges*, to whom I once more return, and with whom I must have a word or two at parting, is not an Atheist. Neither is he a Pantheist, though his assumed facts, as well as his reasonings, are, almost without exception, borrowed from the very lowest Pantheistic school. Not only are his conclusions ill founded, but I think them utterly incongruous, if he adopt not the scheme of material Pantheism. This point I cannot urge against him; for he has a right to be the interpreter of his own creed: and however paradoxical the remark may at first seem. the world would be far worse than it is were not men oftentimes inconsistent. He not merely admits the being of a God; but he expresses this belief, again and again, with all the earnestness of a full conviction; and he considers the material world to have had its beginning in the personal and provident act of a great Creative Will. We must therefore regard him in theory as a philosophical and rational Theist. Neither do I affirm, bearing in mind the grand saving fact of inconsistency to which I have just alluded, that he is not a Christian.

It is, however, impossible to suppose that, consistently with his own principles, he can believe in any form of revealed religion; for he is a Materialist from first to last. He sees in Nature, past and present, nothing but the sequence of second material causes; and any pretended truths not comprehended in this sequence are (on principles resembling those of Hume, but more positive and of wider application) to be put in the catalogue of human fables, or regarded as Bœotian mists that mar the vision of a reasonable man.

Let us shortly retrace his reasoning, and again put the consistency of his logic to the test. He sees a connected series of organic phenomena, and resolves them into natural laws ordained by the Creator. So far all is well, and he is not a Pantheist. He sees again, in the authentic records of Geology, phenomena of a different order, and manifestations of a power that is out of coordination with the known laws of reproduction or natural development. Consistently with his own principles, these phenomena should be recorded under some new descriptive term, like the word *creation;* for, on his own shewing, they do belong to a higher and more direct manifestation of productive energy than he has ever seen or heard of in the uniform course of his experience of organic laws. He ought then to go back to his first principles, and to the consideration of the First Creative Cause; which in truth must have been ever present to his mind (were he a consistent Theist), even in the common sequence of second causes. But he will do no such thing. Instead of this he virtually deserts his own principles, and takes up the weapons of the material Pantheist; who, knowing no power but that of material Nature, must of necessity resolve all phenomena into the successive actions or developments of material Nature. Thus we find him first professing to be the pupil of Nature; and then (with the Pantheists) making a set of transcendental leaps, from Order to Order, and from Class to Class, in most positive defiance of all known laws of organic Nature derived from experience.

Nay, he has done more than this: he has misrepresented Nature, deranged her historical documents, and mistranslated her plainest records. Were he an avowed material Pantheist, this proceeding would be natural; for he would then only distort history to save his principles. As a Theist he is false to his principles, while he distorts history. All this may at first have been done in ignorance of what Nature was; but now that he maintains his conclusions in spite of better knowledge, we must look out for other motives; and they are not far removed from sight. A man who publishes a theory before he knows the facts it ought to rest upon, is not likely to disturb his theory by a reconstruction of its foundations after the facts have been revealed to him. He cannot be so unnatural as to desert his own offspring. His theory must stand at any rate: and if it rest not on the facts of past experience, it *may* rest on facts which are hereafter to be evolved from the womb of Time! This is our Author's logic[*].

An ideal Pantheist may think that all nature is evolved from the mind of man; and that knowledge, even while he is untrained and uninformed, is lurking as an innate ideal rudiment within him. On this scheme, material knowledge is but a kind of phantasm or poetic dream; and a philosopher, like a poet, may "body forth the forms of things unseen," and turn them to what shapes he pleases. Much of this highflying fantastical philosophy we find in the works of Oken. Pythagoras thought there could only be seven bodies in our solar system, because seven is a sacred number. The supposed fact, and the reason given for it, were the mere creations of his mind, and had no *archetype* in nature. Kepler, by some strange notions of celestial harmonies, was led onwards to very great discoveries; for there *are* celestial harmonies, though of a very different nature from those which were first bodied forth in his imagination. The wildest physical notions have sometimes led to truth: and we may, perhaps, allow that a theoretical notion springing up in the mind of man must have some suggestion from nature—either as she dwells within himself, or communicates with him through his senses. No one can tell where analogies are to cease, such are Nature's riches. Let us, then, not despise mere analogies; but let us not worship them. Let us test them honestly; and never pretend to build upon them till they are brought into accordance with material facts, and under the domain of material law. The grievous fault of the Ideal school is this:—they conjure up analogies with all the creative licence of a poet—they accept them under their wildest forms—affirm them without proof, and in the terms of an eccentric and most insufferable dogmatism—and build upon them as if they were the accepted principles of positive material science.

---

[*] There is nothing new in this logic. It fell under the notice of Dr. Johnson, who replied to it as follows:—"He who will determine against that which he knows because there may be something which he knows not—he that can set hypothetical possibility against acknowledged certainty—is not to be admitted among reasonable beings." I have borrowed this quotation from Mr. Hugh Miller, during the passage of these sheets through the press. *Foot-prints of the Creator*, p. 218.

But the author of *The Vestiges* is no Idealist. In theory he is a Deist—in argument he never rises above the low and pestilent exhalations of a dull material Pantheism. He tells us that we degrade our conception of the Godhead by calling in his intervention as a Creator;—that God has ordained material laws from the beginning—and that he resides not within them, but far apart from them, in a sublime "tranquillity that is altogether new." We believe that God is without those passions which belong to our humanity. We allow that the *archetype* of all nature was in his mind before time began. Nor is He confined in space. He exists, in the full power of his personal attributes, through all worlds and every atom of them. One writer calls the universe the *sensorium of the Godhead*. Newton striving to embody his conceptions of the Godhead tells us,—*Æternus est et Infinitus, Omnipotens et Omnisciens; id est, durat ab æterno in æternum, et adest ab infinito in infinitum; omnia regit et omnia cognoscit quæ fieri aut sciri possunt. Non est æternitas et infinitas, sed æternus et infinitus; non est duratio et spatium, sed durat et adest. Durat semper, et adest ubique, et existendo semper et ubique durationem et spatium, æternitatem et infinitatem constituit*[*]. Such are the strivings of the soul of man towards the comprehension of that which can neither be grasped by finite minds, nor expressed by the power of any symbols of human thought. But, thanks be to the God of nature, that He has deigned to humanize Himself—that He has enabled us, through the works of his hands, as well as through his Word, to form some conception of his attributes—that He has given us a high fruition and glorious hopes in these acts of contemplation—that He has taught us to believe ourselves his children, and to count it our highest good to be brought into obedience to his everlasting laws.

Do we exalt our conceptions of the God of Nature, by shutting out the view of his creative energy, and putting Him far distant from us in the repose of a sublime pantheistic tranquillity? I think far otherwise. A repose like this is, to our conceptions, no better than

[*] *Scholium Generale* at the end of Newton's *Principia*.

the quietism of death. Activity is the very essence of intellectual power. We cannot comprehend it as quiescent. In one view we see the great animating First Cause in the laws impressed by Him on the vast bodies of the visible universe. In another view we see Him in positive acts of creative power shewn in the organs of successive animated beings brought into life during long successive periods. Were these works of creative power in conflict among themselves, then would there be ruin and confusion in the world; and by this confusion should we mutilate the grand, coherent, and constant attributes of the Great Supreme. But there is no conflict in the successive acts of creation. They are in glorious unison. We see harmony in nature's laws; but laws make not themselves, and therefore they were ordained by God, and had a beginning. Nay, more than this; we can by our feeble ken discern, within that atom of space we inhabit, the successive times when many successive material organic laws began; and by a power of mind created within us, which lifts us far above our fellow-beings and enables us to grasp the meaning of the word Cause, we also discern and acknowledge the successive acts of creative power.

We know that God has created: but how he creates, we can form not the least conception; for external nature is known to us only through its established laws, and their manifestation to our senses; and these laws imply a past, and not a present creative act. It may be that in the mind of God there is no greater or different exercise of Creative Power in the continuance of a law than in its commencement. But it is not so in the mind of man; for all his thoughts are limited under the conditions of time and space—ideas that have no meaning as a limitation to the creative will of God. That which concerns us, both morally and intellectually, is not the whole truth, as seen in the mind of God; but that small part of truth which the God of Nature has deigned to give us, and is fitted to our condition.

The ideal Pantheist may say, that we have seen no creative acts, and that we know not what creation means, except on his own hypothesis:—in other words, that the act of creation is only in the mind of man. The material Pantheist sees nothing above the sequence of material causes; and he dwells among them only by an act of moral mutilation, whereby he virtually cuts off from his own soul the right conception of Cause. He extinguishes the great inborn principle of Causality. A rational Deist is far apart from these two stunted schools; he follows Nature, and believes in Nature's God. Believing that God must have at one time created, he has admitted all we want for our argument. What God has once done may be done again; and the question of an act of Creative Power, under any supposed condition of time or space, becomes a question of fact to be decided by the test of sense and reason. The Author of *The Vestiges* admits this principle, but denies the inevitable conclusion from it. He is in name a Theist; he is in reasoning but a material Pantheist.

We concede then to the ideal Pantheist that we see not God creating, and that we only know the exercise of creative power by its effects. We pretend not to determine what creation means in the mind of God, or how He has created. What we know of creation comprehends only certain phenomena of Nature, produced by a Power above Nature, and limited in time and space. But creation, as contemplated in the mind of God, has, we repeat, not one of these ideal limitations. The movements of his Will are the beginnings of every material cause, and these movements have no limitation in time and space. It is then utterly beyond the reach of human thought to comprehend what creation means as contemplated in the mind of God. But we do see the proofs of a creative energy within that speck of the universe wherein we dwell; and these acts of energy *are defined in time and limited in space*, or they could not be the objects of our contemplation. We not only see that God has created; but we also comprehend in part that his creation is in harmony with itself. We know what belongs to the condition of our being; and it is enough for us, if we use that knowledge in conformity with our position in the world of Nature. "The fool hath said in his heart, There is no God." We deprecate this outrageous folly. We dare not, with either Pantheistic school, deny the principle of Causality so as to reverse the whole condition of our knowledge; and then impudently pretend, either to evolve all knowledge from the mind of man, and thereby to set it in the place of God; or to deny all difference between mind and matter (by resolving all nature, dead and living, into a mere sequence of material laws), and thereby to deify the dead elements.

It has been stated by our Author, in language that I cannot read without feelings of loathing and deep aversion (for it is irrational, ignorant, and profane), that God is not a present living providential governor of the world of nature—that He pays "no minute attention to specialities"—that He resides at a distance from Nature in a sublime inoperative tranquillity—that the creation of an organic being is "an inconceivably paltry exercise of Creative Power," and that if we accept not the Pantheistic reasoning of *The Vestiges*, the world is full of "blemishes and blunders." But is a blemish less because it springs from a law ordained by God? A blemish is a blemish still, though it spring from a general law. It either implies a want of foresight, of power, or of will. But what right-minded man will dare thus to tax the great unchangeable God of Nature, and tell Him of blemishes and blunders in His work? We know little of what creation is: and by the light of Nature we know nothing of those inner movements of Almighty Will from which creation sprang.

How little do we know of the great scheme of Nature! All we see around us is on a plan; or rather it is a fragment or an atom of a still greater plan. The meanest reptile on which we trample is an organic part of the whole visible universe; and this is true though we deny the existence of living beings in any sphere of visible space except our own. Every animal endowed with eyes receives continual impressions from the remotest visible bodies of the world; and through the rays of light it is linked organically to the stars that glitter in the sky. In turn it acts materially and positively on every one of these most distant glittering bodies, and thereby helps to uphold the stability of the universe.

It is true that all we see is on a plan, and that the *archetype* is in the Godhead: but all we see is but an atom of infinity; and every organic being (great or small, as we count greatness) is but the atom of an atom; yet all these atoms are comprehended under the laws of God's ordaining. If we reject the dreams of the Pantheist, and believe, with the rational Theist, that there dwells, above all we know and see, a Great First Cause that ordained all things by a personal creative act, and brought life out of the dead elements—what right have we (believing this) to say that God is not now creating, even within the limits of that small portion of the universal world, that mere atom (for all we see is but an atom) which we comprehend by sense? Within the limits of that atom of nature which we inhabit creative energy has shewn itself, again and again, among the monuments of by-gone time, though to our senses it may now appear at rest. But among the many million worlds, of which we see the germs in the sparkling atoms of the sky, organic creation may (for ought we know) be in continual activity; and creative power may be shewn continually, both in upholding laws that began in times past, and in ordaining laws which beforehand existed only in the prescient mind of God. We can conceive all this; and we can believe that all these laws had not only a spiritual communion in the mind of God, but that they all formed but one great scheme of nature, every part of which had a direct material connexion with all the rest (no matter what their separation in visible space), through the definite intervention of material laws. On this view of nature, should there seem to the prying curiosity of men some nook or corner of the world they live in wherein they discern a fancied imperfection of organic plan, let them remember their place in nature, and the narrow limits of their intellectual vision, and let them not accuse a plan of which they only see an atom; but rather believe that in the great *archetype* dwelling in the mind of God, there is no blemish,—and that they themselves, in a higher condition of intellectual fruition, may have a truer vision of the Great Creator's work—that the mist which dims the sense may then pass away—that then they may comprehend harmonies they now but hear in part, and perceive a glory at present unfitted for mortal sense. It may be objected that speculations such as these are drawn from the imagination, and based on our ignorance rather than our knowledge. But I urge them not as the foundation of any positive scheme of nature. I urge them only in reply to schemes that are quite as imaginative; and on which conclusions are made to rest that are positive, false, and degrading.

We may meet hypothesis by hypothesis, if we are to fight our battles on ideal ground.

By whatever natural means we soar above the earth, to the earth we must soon return. A material philosopher of the true school of nature ventures not, with the ideal Pantheist, to climb by his own strength into the heaven of heavens, and thence to reflect back upon the earth, and all things therein, a pretended light that belongs only to the perfections of the Godhead. If his soul be thither led it can only be by the hand of God; and then, in the irradiation of a celestial light, he may learn to see, "and tell of things invisible to mortal sight." But this belongs not to material truth, but to another and far higher teaching.

The great principle in material science, to which I again return, is this.—All material science is inductive in its beginnings and in its early progress. Transgress this great principle, and we let loose a fantastical philosophy that may put forth the gaudy flowers of the imagination, but ripens not into the goodly fruits of truth and reason. Facts, at first apprehended by sense, may in the end pass, by successive acts of the mind guided by successive experiments, to the side of abstract or ideal truth, comprehended under our conception of a physical law. In this new condition they may become the root of *deductive truths*—not now in the way of experiment, but by the efforts of pure reason. This we all of us admit; and we rejoice in the passage of our empirical and disjointed knowledge into this well-embodied form and substance. Abstract material truths, no longer the object but the subject of human thought, are the best lights of the natural world; and they belong to those provinces of knowledge in which the mind of man has made its firmest and fairest conquests. But on the outskirts of the region of light there is an ill-defined, dim region into which the torch of experiment can only guide us: and here it is that the champions of material truth are doing their severest battles, and carrying on their conquests. The advance is slow; but sure, if we follow nature; and after many an ebb and flow the wave of truth spreads onwards. But is this toil to cease? Is this work to be ever done? Far otherwise. If we are to continue victors we must in every age fight the same battles, that were fought in the age before us. We must not merely defend the frontier line, but we must enlarge the boundary, or the powers of darkness will gain back what was won before. There is to be no stagnation in this spirit of conquest. The laws of nature forbid it, and deny us any continued rest from that toil which is the first condition of our duty, and (thanks be to the God of Nature!) the great element of our happiness. Whatever boundary we reach, still there is an infinity beyond, into which the light of science has not pierced; so that the wider the expansion of our knowledge the larger the visible darkness that surrounds us. Through this dim and boundless region the eye of unassisted sense cannot penetrate; ideal philosophy has no place within it, neither can imagination body forth the glories that may hereafter be seen within it. Nor can we pass one single step within it but by the guiding light of experiment, and by the help of those material weapons the God of nature has committed to our hands, and commanded us to wield; and these weapons we are bound to wield, for His glory and the good of our fellow-men.

But though our progress in material knowledge be thus fettered by stern unbending laws which both control and direct our onward movements, yet are there high capacities within us, not fettered by mere dead material laws, whereby we can soar to a conception (dim and feeble though it be) of a mighty power in nature beyond all that sense informs us of—which tells us of a Being to whom light and darkness are both alike, and who dwells through all worlds, but in a light that is unapproachable to mortal sense. To Him we owe the homage of our reason, and of every faculty and feeling of our immaterial nature: and to Him we can also give a bodily homage, by enduring toil—by patient experimental labour—by a continued study of his material laws—and by learning our true place and duty among God's creatures; thereby teaching our fellow-men to see through all nature the proof of nature's God, and in the strength of that belief to perform their tasks with cheerfulness; and in good hope that in the end they may reap that fruit which He has given as the reward and encouragement of patient and well-directed toil.

To deny the creative providence of God is to deny the foundation of law and order. To deny his continued Providence, is to shut from the soul every reasonable hope and aspiration after higher good—To rest upon a Pantheistic scheme of physics, and to derive the *archetype* of knowledge only from the mind of man, is utterly to mistake the history and nature of human knowledge—To deny the inductive foundation of every form of material truth, is to deny the lessons of past experience, and virtually to cast away those weapons the God of nature has put within our hands, without which we must remain in powerless ignorance, and be shut out from that higher earthly happiness which is the good fruit of our conquests over the material world.

I fear, on reconsideration, that in a paragraph near the beginning of the previous Section (p. ccxxix.), I have not given the full strength of Paley's argument. He tells us, in reply to Hume, that there is a want of logical justice in a statement "which (while affirming the incredibility of miracles) suppresses all those circumstances of extenuation, which result from our knowledge of the existence, power, and disposition of the Deity; his concern in the creation, and the end answered by the miracle; the importance of that end, and its subserviency to the plan pursued in the work of nature."—During the passage of this sheet through the press, I have also examined Mr. Stuart Mill's Chapter "On the Grounds of Disbelief." (*System of Logic*, Vol. II. c. 25). It is very ably written, and there are not, I think, in it any general principles to which I could not subscribe. "Hume's celebrated principle, that nothing is credible which is contrary to experience, or at variance with the laws of nature, is (Mr. Mill tells us) merely this very harmless proposition, that whatever is contradictory to a complete induction is incredible. That such a maxim as this should either be accounted a dangerous heresy, or mistaken for a great and recondite truth, speaks ill for the state of philosophical speculation on such subjects." ...... "It is essential to the completeness of an induction that it shall not contradict any known fact. Is it not then a *petitio principii* to say, that the fact (viz. a supposed miracle) ought to be disbelieved because the induction opposed to it is complete? How can we have a right to declare the induction complete, while facts, supported by credible evidence, present themselves in opposition to it?"......Again, he tells us, "A miracle (as was justly remarked by Brown) is no contradiction to the law of cause and effect; it is a new effect introduced by a new cause. Of the adequacy of that cause, if it exist, there can be no doubt; and the only antecedent improbability which can be ascribed to the miracle, is the improbability that any such cause had existence in the case. All, therefore, which Hume has made out is, that no evidence can be sufficient to prove a miracle to one who did not previously believe the existence of a being or beings with supernatural power; or who believed himself to have full proof that the character of the Being whom he recognises, is inconsistent with his having seen fit to interfere on the occasion in question."

If these extracts bring out Mr. Mill's full meaning (and I have done my best not to misrepresent him), then I think that his logical position cannot be assailed by any reasonable argument.

"It is now (he further tells us) acknowledged by nearly all the ablest writers on the subject, that natural religion is the necessary basis of revealed; that the proofs of Christianity presuppose the being and moral attributes of God."......"There is no reason that timid Christians should shrink from accepting the logical Canon of the grounds of Disbelief, (viz. that whatever is contradictory to a complete induction is incredible): and it is not hazarding too much to predict, that a school which peremptorily rejects all evidences of religion except such as, when relied upon exclusively, the Canon in question irreversibly condemns; which denies to mankind the right to judge religious doctrine, and bids them depend on miracles as their sole guide; must, in the present state of the human mind, inevitably fail in its attempt to put itself at the head of the religious feelings and convictions of this country." Here again I agree with the Author's conclusion; but I cannot do so without a few words of explanation, and some verbal limitations.

(1) If we begin to examine the foundations of our belief, we can only begin our task on reasonable and logical grounds. We are not called on to believe what positively contradicts the first elements of our reason; and no evidence, however strong, can enforce such a belief as this. But men may, in times past, have

seen good reasons for believing in the authority of a teacher, and on the strength of that authority may have believed, not what was contrary to reason, but what was above reason, and what unassisted reason could not have taught them. Miraculous powers would, in any age, be a good test of authority; and might therefore be an evidence for our belief in matters far above the common inferences of reason.—Again, a man may learn to believe in the prophetic character of the older documents of his religion. He can sift this evidence, and may be convinced by it: and if so, he has an evidence that cannot be assailed by Hume's argument; for it is not contrary to historical experience, but is based upon it. He can read these ancient documents, which ever since their publication have been in the custody of men who have regarded them as deposits of sacred truth. He can compare their prophetic declarations with the events unrolled in the subsequent history of the human family; and by such a comparison may be convinced of the truth and inspiration of these Prophetic books. But here also we must first suppose that he has a religious nature, or that he believes in God; for otherwise he will turn away from the light of this kind of evidence, and he will disbelieve it; either because he will not examine it, or because it is little suited to the condition of his understanding.

(2) There is a belief of the heart as well as a belief of the understanding. If a man have the second, and not the first, he may be a good logician and a

learned theologian, but he has no religious faith. If a man have the first and scorn the second, he is a fanatic. But a good religious man has both; and in missing this conclusion Locke has, I think, made a great mistake*. There is something wanted more than mere logic in the examination of our belief. It must continue to act on our feelings, or it is worthless; and herein is the great practical difficulty of a religious life.

(3) The logical order and the historical order of our belief are two things widely different; and this is true in every department of our knowledge: we believe first on authority, and we examine afterwards. We know not in what mental condition man was first created; but we have no reason to believe that he worked out his first elements of knowledge for himself. We believe, on the contrary, that he was placed on the earth with a knowledge suited to his position. We know from all tradition, that the earliest races of mankind were in some form or other religious: but their religion rested on authority, and they seem not to have troubled themselves with a logical examination of its foundations. All religion (whatever be its form) implies, no doubt, some belief in a God: but what we call natural religion did not, I think, in any distinct and logical form, historically precede revealed religion, but followed it.

(4) That natural religion is the necessary (or I would rather say the logical) basis of revealed, is undoubtedly true: if the foundations of our belief will not bear the most searching examination of reason, it seems

---

* *Infra*, p. 68.

impossible that our religion should remain secure, or have any continued acceptance as the ground of hope or the rule of life. This I have virtually stated in the following Discourse, and in different parts of the Appendix. An Apostle might as well have preached to the stones of the wilderness as to the heathens whom he converted, had there not been some element of belief within them, or some natural element lurking in their minds and ready to spring into life, when religious truth was offered for their acceptance.

(5) When we say "that natural religion is the necessary basis of revealed," we mean not, however, to affirm that revealed religion rests with its whole weight upon the truths of natural religion, like a building made by the hands of man that presses with its whole weight upon its foundation-stones. This is not our meaning. What we mean is, that when we seek for the logical history of our belief, we must have some starting point to reason from; and the truths of natural religion (or, which comes to the same end, the elements of a religious nature within ourselves) give us the very starting point we want. On the other hand we affirm, that there have been millions of good religious men who have never thought of the first logical grounds of belief; and yet have believed rationally, and practically, on good and sufficient grounds of moral evidence. Again, a man can make no good progress in religion as a rule of life, if he spend his time too long in a logical discussion of its elements, and in delving among its first foundations.

(6) When a man has accepted the great truths of religion, and it forms within his mind a system of belief, he has the power of gaining an incomparably higher evidence of its truth, than he can derive from any discussion of its first logical elements. This is no fanatical conclusion. It is only fanatical when we reject the logical evidences of our faith, turn away from them with scorn, and speak ill of those who put them before us in sincerity.

The same, or nearly the same, may be said of the great truths of science. To take a familiar case—We know experimentally the universal gravitation of matter on the surface of the earth. Does this gravitating force extend to the moon? On trial we find that it does, and that it is the very force that keeps her where she is in the heavens. We then go a step farther, and try whether the same kind of central force may not keep all the Planets in their orbits. After a few simple steps of proof, we find this hypothesis also to be true. We then generalize our facts, and affirm the law of gravitation through the whole Solar System. The law of gravitation is no longer the object of search, but the subject of thought and speculation. We can now reason deductively, and draw true conclusions from it; and our deductive truths (such for example as the secular perturbations worked out by La Place, or the theoretical discovery of a new Planet by Adams and Le Verrier) give us a thousand times the weight of evidence that can be given, in proof of our law, by any series of direct experiments. But we do not forget our first experiments, and we are willing to return to them again, should any new phenomena call us back to them. If we refuse to do this, we give up the sound doctrines of true philosophy, and begin to side with the sect of pantheistic dreamers.

This kind of reasoning may be safely applied to our religious belief. There are certain elements of religion within us—we have a religious nature. These elements, when acted on agreeably to God's will, lead us to higher knowledge, and to the conception of a religious law, or a practical system of belief: and when religion is contemplated by us as a law, it becomes (like the general truths of science) capable of incomparably better illustrations and higher proofs that it was in its first beginnings. But we dare not on that account affirm that it is independent of its reasonable foundations, or those logical proofs which properly belong to it, and may at first have suggested it to the mind; any more than we dare affirm that an inductive material law is independent of those experimental proofs which first suggested it to the mind. If we do make such an admission, we damage the whole fabric of religion, and may, perhaps, destroy it utterly in our hearts by giving up its strong holds to the dreaming Pantheist.

I think the previous illustration true; but let me not be misrepresented or misunderstood. Religion does not generally exist in the mind as a system that has been built up logically, and gained access to the understanding, step by step, like the truths of geometry. It does exist, however, as a system or a law of belief: and in that form it admits of incomparably higher evidence than we can derive from any sifting of its first logical elements. Accept religion as a law, and we can (as in a general law of physics) reason analogically and deductively from it. We find new evidence as we go on with its application. We find it suited to our condition, and to our wants. It explains the secrets of our hearts, encourages us in all good and noble deeds, and gives them a sustaining principle and an enduring sanction; it consoles us in our days of sorrow, and smooths our pillow in the hour of death. It is the only perfect antagonist to brute passion, and it is the living fountain of love and charity. It rises higher and higher still in evidence (directed both to the heart and intellect) if we embrace it faithfully. It is still but in progress, and its full fruits have not yet ripened; but it has brought out the best development of the mind of man, and the best types of human polity. It urges on, exalts, and sanctifies all knowledge, and is therefore in harmony with all nature.

At one time I meant to have ended this long Preface here. But other questions, bearing on the evidences of religion, seem to demand a passing notice, however feebly and imperfectly I may touch upon them: and I cannot properly conclude without some discussion of the changes now about to be introduced into our course of academic study.

PART II.

§ 1. *Pantheistic views of Revelation and its Evidences, and comments on the Newtonian Philosophy—Evidences of Christianity historical and prophetical—Moral purity of the Gospel—Its propagation, and effects on the progress of man, &c.—Arguments from Analogy.*

It would indeed be a vain and useless task were I to attempt a discussion of the general evidences of Christianity within the compass of this Preface. They separate themselves into many distinct provinces of philosophy and learning, each of which might require a large volume for its illustration. For such a task I have neither leisure, nor capacity, nor sufficient knowledge. One or two points only will I now touch upon, as they seem to arise quite naturally out of the previous discussions through which I have done my best to be the student's guide.

In every part of human knowledge—physical, social, moral, and religious—we are almost compelled, during at least one portion of our life, to take our principles for granted. There is no help for this; and we could not advance without it. We must take for granted that the great principles we cannot work out for ourselves (as least during our early years), have been laid on sure foundations by those who have gone before us; and there are multitudes of good and useful men who have neither leisure nor capacity for any profound examination of their principles. But the social and religious services of such men are not the less real on that account; and we can admire and love them for their humble and honest devotion to the cause of truth according to the lights they have.

But in the progress of our knowledge we are sure to learn that some of our early conceptions were not what they ought to be, and that the relations of physical and moral truths are by no means what we may have at first imagined. We may, for example, have thought that all physical truth was contained in the records of our religion; and afterwards finding this opinion not true, we may, perhaps, by a kind of natural recoil and in the pride of newly-acquired knowledge, begin to think that all religious truth is contained in the body of physical science. In this kind of conflict men are driven back upon their first principles, and compelled to examine the foundations of their knowledge, whether relating to divine or human things. If we are men of honest minds, and unwarped by prejudice or party, we can hardly fail to see—that if there be religious truth, as there assuredly is, it must be in its essence distinct from physical truth, and must rest on a different foundation:—and that if there be, as there is, a real demonstrative body of physical truth, it must also rest on its own foundations, which are in no wise to be confounded with moral evidence. But truths, though distinct, are not therefore in conflict; and though resting on different foundations they may give help and support to one another.

We naturally feel an inner revulsion whensoever the foundations of any old opinion begin to be shaken; and men often find it far easier to stand still, and fling out bitter words, than to turn back and examine (it may be for the first time) the foundations of their knowledge. If they be reasonable men they must see that their knowledge is but a tottering fabric if it will not bear the most prying search of reason.

In the mental conflict to which I have just pointed, instead of acting wisely and prudently, men have often acted most foolishly and extravagantly. One party clings only to old foundations. Another party learns to distrust the past, and, in the pride of new discovery, thinks it a glorious task to be employed in uprooting all old foundations, and in putting all knowledge, human and divine, in some light "that is altogether new:" and half-informed, shallow men, will often be seen in the front rank of these audacious innovators. Truth is with neither of these parties, and may sometimes, perhaps, be found between them; but oftentimes she seems to shun the company of both, and to keep far away from their discordant wranglings. We must however allow, that if new discoveries, which are of value to the human family, be made by either of these conflicting parties, we must look for them among the daring innovators, rather than among those who venture not to lift their eyes from the old and, it may be, the ill-secured foundation of their knowledge. The true business of philosophy is not however to uproot all old foundations; but to strengthen those which are good, to take away those only that are bad, and to bring the different parts of human knowledge into a true logical and moral accordance. If we fail in this, we fail in the great end and aim of all knowledge.

The grand intellectual fermentation that has been going on in Germany, and the vast progress made by the Germans in the discovery of physical, philological, and historical truth, have been, no doubt, among the most remarkable phenomena of the civilized world during the greater part of a century. But great good has generally an alloy of great evil: and it is our duty, so far as we may, to separate the good from the bad. To apply this remark to the subject of our religion—It would ill become Englishmen who have been well trained in academic learning, to speak of the Rationalism of Germany as only an unmixed evil. And were it so, we should gain nothing by hard words, if we assailed it not by sound arguments; yet on this subject hard words are sometimes the only things we see in well-meaning but shallow books of religious controversy.

I believe, however, that some young men of this University have had their peace of mind destroyed and their faith blighted by the subtilties and refinements of Rationalism: and (as I have hinted above) there is a low form of Rationalism that ends in ideal Pantheism. In that form it is an atheistical and abominable idol. Which of Bacon's *idola* it represents, I hardly know. Perhaps it represents them in an united form, and is like an oriental idol with many heads and hands; but not less an idol because it leaves that type which is the external attribute of humanity.

The work of Strauss on the life of Jesus shews us the extravagance of Rationalism pushed into the form of Pantheism, or something very nearly approaching to it. His object, if I understand it rightly, is to shew that the Gospel is not a true history; and this he strives to make out by a subtle, hostile, and captious criticism—conducted like the cross-examination of a cunning advocate, whose business is not to make out the truth in a seeming conflict among the minute details of evidence, but to destroy, by whatever means, the credibility of a witness who is opposed to him. If a man have little knowledge of the Gospel, and no reverence for it, he may probably be misled, and cheated out of all the hopes of a religious man, by this kind of special pleading: but if he know it and respect it, his faith will be as little shaken by such forensic subtilties, as is a rock by the collision of a bubble. He will even see that some of the very discrepancies in this part of sacred history are pledges of its truth: for they are minute and unessential, and prove to demonstration that the authors of the Gospels drew not up their narratives in the spirit of falsehood and collusion.

Again, the apparent discrepancies in the sacred history (such, for example, as those we see in the Gospel accounts of our Saviour's crucifixion and resurrection) stand out on the surface of the narrative, and are palpable to common sense. The great essential facts are true and undisputed; but there are minute points of difference in the several narratives which have existed since the earliest times, and prove that the primitive Christians were too honest, and had far too great a regard for the sacred text, to change so much as one word of it in the view of bringing the Gospels into a more verbal and literal accordance. If a man, I repeat, have little or no knowledge of the Gospel, and lead a life so little in accordance with its precepts, that he cannot, without a great moral change, have any firm hopes of being a sharer in its promises—then the destructive criticisms of Strauss may perhaps root out every germ of his belief; and he may become what his master seems to be—an infidel, and a Pantheist[*].

---

[*] In this faint sketch, not so much of Christian evidence as of its principles, I am compelled, as far as possible, to avoid details and specific instances; but lest what is above stated should be misunderstood, I will appeal to two cases in point. (1) In the second chapter of St. Luke's Gospel we are told of a decree of Augustus Cæsar, "that all the world should be taxed," and the Evangelist adds, "this taxing was first made when Cyrenius was governor of Syria." This parenthetical clause may have been a marginal note by some other hand, and have afterwards found its way into the text by mistake It involves a chronological difficulty of which different explanations are given by different Christian writers. (2) St. Mark describing the crucifixion of our Saviour, tells us, "it was the third hour, and they crucified him." But we learn from St. John (who was an eyewitness, and wrote his Gospel some time after that of St. Mark was published) that "about the sixth hour" Jesus was still before Pilate, and that he was soon afterwards crucified.

I will dismiss all the explanations of these difficulties, and suppose (for the sake of argument) that St. Luke made a chronological mistake in stating a known fact of Roman history—and that St. Mark (who was probably not an eyewitness) made a mistake in describing the hour when our Saviour's crucifixion took place. Do we, then, invalidate the truth of the Gospel-history, or its inspiration, by any such concession? not, I think, in the least degree. Inspiration implies an honest, truth-loving spirit on the part of the sacred writers; and implies also a knowledge of religious truth and doctrine derived from supernatural and divine authority; but it by no means implies, that in matters of common history, or in events about which an Apostle could (like any other man) judge by the plain evidence of his natural understanding and his senses, he had any positive inspired guidance. If we hold a contrary opinion, and demand for the sacred writers nothing short of a plenary inspiration, we become involved in most formidable difficulties, and virtually undermine the authority of miracles, The next point at which Strauss labours (at least by implication), is to shew that the Christian scheme is true so far as it is a phase in the development of the mind of man. It is true that Christianity is a development of Judaism. But how is it developed? By that which seems a destruction of Jewish nationality, by a lowering of their national hopes as a chosen people, and by the removal of those forms and symbols which were the nation's pride, and to which, as a matter of history, mankind are found to cling with most unyielding pertinacity. And who were the men who wrought this great revolution in opinion, and perfected this scheme

which first appealed to the natural senses for their evidence. The discrepancies, here noticed, have no bearing on any religious doctrine or sectarian opinion; nor can the shadow of any ground be shewn why an Evangelist should have wished to misrepresent the facts out of which they have arisen.

We may further remark, that after the terrors of the Apostles on the apprehension of their Master, when they all deserted him and fled away—after the miseries of the nocturnal trial—and after the protracted hesitation of Pilate the morning following; we need not wonder that some of the disciples of Jesus (who had not the same means of measuring time which we have now) should have mistaken the exact hour of the crucifixion. St. John's account is the evidence of an eyewitness, and has also the greatest internal evidence. On the strength of it, then, we believe that our Saviour was crucified about noon: and he died at the ninth hour (at three o'clock as we now count time), while the smoke of the evening sacrifice (from that hour without spiritual efficacy and meaning, and done away for ever) was rising from the great altar of the Jewish temple. The duration of our Saviour's agony on the cross was therefore about three hours; and this shorter period of agony explains a fact mentioned by St. Mark—the *surprise* expressed by Pilate when he heard that Jesus was already dead: ὁ δὲ Πιλάτος ἐθαύμασεν, εἰ ἤδη τέθνηκεν. (chap. xv. 44.)

Do any examples such as these (we ask) justify a man in thinking that the Gospels are not true histories, but mythic visions and metaphysical phantasms evolved out of the minds of the Apostles? If a man can give an affirmative reply to such a question, he has deserted the best elements of his reason, has entrenched himself within a mystical fence, and has no weak side of common sense accessible to a sober argument.

of development? Plain, unlettered, simple, earnest men, who forfeited their national privileges, and gained in return but scorn and mockery, loss of friends and home, bitter persecution, and a death of torture. Had Christianity been worked into its present form by a learned committee of the Sanhedrim, and then promulgated by national authority as a new and matured form of the old religion, there might have been, at least, a show of truth in the pantheistic view. But take the historical facts of Christianity as we find them, and the pantheistic scheme (that derives all knowledge and progress, whether physical or historical, from the mind of man, by a form of *à priori* reasoning, and through the power of natural development), is worthless as a representation of sacred history, and will not bear the test of common sense and reason.

The older Rationalists admit the historical character of the Gospel, but (on principles like those of Hume) deny its miracles. The modern or pantheistic Rationalist turns the whole Gospel into a myth or poetic dream; and yet some of this school pretend, in their own mythical sense, to admit the miracles of the Gospel as symbols of the development of the human mind. Which of these parties may be victors in the contest now going on between them, is a matter of little moment to any man who deserves the name of Christian. The older Rationalists deprive him of the best evidence and sanction of his religion, and mutilate its doctrines: the newer Rationalists extinguish his religion altogether, even while they profess to defend it. For the pantheistic philosophy rejects all notion of a personal Creator or Redeemer above and out of ourselves, and all hopes of a personal immortality. With their school, Idea is God, mankind is Christ, and the Gospel is but a collection of dreamy visions and unsubstantial legends. A religion such as this is but Atheism in disguise, and deserves no better name. And, after all, it is not new. It is but "the revival," in a new metaphysical dress, "of the esoteric doctrines of Brahmanism and Paganism:" yet those who teach these doctrines now are to be held up as if they were fit objects for our idolatry, and are lauded (in terms sometimes of tasteless and abominable profanity) as the restorers of true philosophy.

Schelling "taught an absolute indifference or identity between the subject and the object—between thought and the essence contemplated by it;" and in his *subjective idealism*, the identity of man with God seems to be made a matter of intuition. Hegel went somewhat farther, and in his *absolute idealism* professed to demonstrate the same conclusion logically. Strauss is a zealous disciple of Hegel's school; "and (as is stated by Dr. Mill, with whose opinion I heartily concur) it is far more from a desire of working out, on a historical ground, the philosophical principles of his master, than from any attachment to mythical theories on their own account, that we are clearly to deduce the destructive process which he has applied to the life of Jesus*." He boasts of his freedom from prejudice and prepossession. But it is a very idle boast; for the spirit of an adopted scheme of philosophy breathes through every chapter of his work; and his boasted freedom is but a servile determination to make all authority however venerable, and all historical arguments however well supported, give way before his master's metaphysical creed, which he accepts without reserve, and makes to stand in the place of demonstrated truth. We may venture to affirm that no historical truth, sacred or profane, could be secure against such a form of trial. I am not, vainly and foolishly, pretending to enter into a formal combat with the doctrines of Hegel and Strauss: all I wish to do is to point out what are the fundamental principles of these authors, and to what they lead. At the same time I do affirm, that we have nothing to fear from these principles, if we are true to ourselves. Hegel's philosophy is little fitted for the English mind; and will never germinate freely within it: and in the evidence brought before our students during the annual ministrations of our Church, and even in the short works which belong to the religious portion of our ordinary undergraduate's course, we have the materials for a substantial refutation of the most formidable subtilties and sophistries in Strauss' *Life of Jesus*.

---

* *Observations on the Application of Pantheistic Principles.* Cambridge, 1840.

I have already stated that our ideal Pantheists are the revivers of hero-worship; and we find, among the followers of their sect, many who talk of their leaders in the language of idolatry, and deck the chosen hierophants of their metaphysical creed with attributes that belong only to the God of nature. Hegel is the great divinity of this revived worship: and he may well take this place, if he have indeed (as his writings seem to tell us) evolved out of his own mind an *Encyclopædia* of knowledge, the *Science of Logic*, the *Philosophy of Nature*, and the *Philosophy of Spirit*. In so wide a range it is no easy matter to hit upon *experimenta crucis* whereby to test the truth of the positions laid down in this *Encyclopædia:* but (thanks to the Master of Trinity College*) we may now bring a portion of Hegel's *Philosophy of Nature* to a ready test, and try it, once for all, by placing it side by side with the most certain conclusions of inductive science.

He pretended to criticise the fundamental propositions of Newton's *Principia*, and to explain Kepler's Laws. If he did not understand Newton's *Principia*, he had no right to criticise that great work: if he did understand it, he most shamefully misrepresented it.

While he takes on himself the task of a critic he tells us that great injustice has been done to Kepler by those who ("in the common way of speaking"!) say that Newton found out the proof of Kepler's Laws. We say in reply, that Kepler discovered his three Laws empirically. He proved them to be facts of astronomy. Newton gave the reason of them, and shewed them to be the necessary consequences of a fundamental principle, in Nature, which he discovered and demonstrated. From this new principle, not merely the three Laws of Kepler, but a multitude of other consequences (forming the great body of physical astronomy) follow of absolute necessity. Hegel's comment on the separate propositions of Newton is but one mass of ignorant blundering. He clearly does not comprehend the meaning of Newton's expressions for central force, or the reasoning from which they are derived. He regards Newton's demonstrations as a tangled web of unmeaning lines; and then, to enforce his criticism, adds, that the same expressions may be derived analytically from the Keplerian laws. Is it possible, we reply, that Hegel was so ignorant of the first elements of exact science, as not to have known (when he wrote his comment), that the analytical and geometrical proofs are virtually the same, that the analytical proofs contain the equivalents of the Newtonian geometrical lines, though they do not represent them pictorially to the senses? We destroy not Newton's proofs by translating them into a series of more concise analytical formulæ; and La Place (as well as all the other great men who, during the past century, made the noblest use of analytical demonstrations) ever spoke with admiration of Newton's proofs, and of "the greatness of his genius and good fortune."

---

* See a short, but most instructive paper, "On Hegel's Criticism of Newton's *Principia*," *Cambridge Phil. Trans.* (May 21, 1849). The reader has now no need to turn over Hegel's *Encyklopädie*, but may see all he wants on this subject, extracted and condensed by Dr. Whewell into the compass of eleven pages.

Hegel's comments on the planetary motions in elliptic orbits shew a like ignorance of the first elements of mechanical philosophy. The very generality of Newton's proofs—that which constitutes their excellence and certainty—is made a matter of objection. I cannot reply formally to this part of his adverse criticism; for the attempt would involve me in technical details unfitted for this section of the Preface: but I affirm, that it is one unmixed, unredeemed mass of almost incredible ignorance and blundering: and for a proof of these strong assertions I refer the Cambridge reader to the condensed Paper in our *Transactions* which I have already quoted. In conclusion, I may, however, remark, that he does, what has often been done before, and will often be done again by persons who pretend to speculate on the conclusions of exact science before they understand its first elements—He regards centrifugal and centripetal forces as if they were conceptions of the same nature. The former (I surely need not inform the academic reader) is not an *extrinsic force*, but is an intrinsic, mechanical, and necessary consequence of the curvilinear motion of any body revolving about an attracting center. The latter *is a true extrinsic force* urging the revolving body towards the center. One who has not learnt to grasp this distinction, is in a poor condition to undertake a sane comment on the *Principia*.

He who pulls down an old system, ought in fairness to build up another in its place. If Hegel has destroyed Newton's proof of Kepler's Laws, let us see what better proof he has to offer us. His proof of the first Law: viz. that the planets revolve in elliptic orbits, is as follows; "For absolutely uniform motion the circle is the only path. The circle is the line returning into itself, in which the radii are equal; there is for it only one determining quantity, the radius. But in free motions the determinations according to space and time come into view with differences. There must be a difference in the spatial aspect in itself, and therefore the form requires two determining quantities. Hence the form of the path returning into itself is an ellipse." If we can regard this account as reasoning (and we must have risen far above the regions of common sense if we can so regard it), the conclusion (as is remarked by Dr. Whewell) does not by any means follow. And why must the orbit be a curve returning into itself? "Because (says Hegel) of the determination of particularity and individuality, of the bodies in general, so that they have partly a center in themselves, and partly at the same time their center in another"! We cannot condescend to grace this egregious nonsense with the name of reasoning. And (even admitting it to be sound) it proves, as is shewn by Dr. Whewell, the impossibility of known facts as much as it proves anything else.

Let us next look at Hegel's new proof of Kepler's second Law: viz. that the radius-vector of an elliptic orbit sweeps over equal areas in equal times. It is as follows: "In the circle, the arc or angle which is included by the two radii is independent of them. But in the motion (of a planet) as determined by the conception, the distance from the center and the arc run over in a certain time must be compounded in one determination, and must make out a whole. This whole is the sector, a space of two dimensions. And hence the arc is essentially a Function of the radius-vector;

and the former (the arc) being unequal, brings with it the inequality of the radii." If we could, even in courtesy, call this reasoning, it would not (as Dr. Whewell remarks) prove the conclusion required. "It would only prove that the arc is *some function or other* of the radii."

Lastly, let us examine the new proof of Kepler's third Law: viz. that the cubes of the mean distances of the planets are as the squares of their times of revolution. In the case of falling bodies, Hegel tells us that Time and Space have a relation to one another as root and square. Falling bodies however are the case of only *half-free* motion, and the determination is incomplete. "But in the case of absolute motion, the domain of free masses, the determination attains its totality. The Time as the root is a mere empirical magnitude: but as a component of the developed Totality, it is a Totality in itself: it produces itself, and therein has a reference to itself. And in this process, Time, being itself the dimensionless element, only comes to a formal identity with itself, and reaches the square. Space, on the other hand, as a positive external relation, comes to the full dimensions of the conception of Space, that is, the cube. The Realization of the two conceptions (Space and Time) preserves their original difference. This is the third Keplerian Law, the relation of the cubes of the distances to the squares of the times." "And this," he adds, "represents simply and immediately the *reason of the thing:* while on the contrary, the Newtonian Formula, by means of which the Law is changed into a Law for the Force of Gravity, shews the distortion and inversion of *Reflexion*, which stops halfway." Self-complacent solemnity, and human folly working on a system, never before reached a deeper bathos of absurdity. But Hegel rejoices, like a giant, over his vanquished enemy. "The motion of the heavenly bodies is not a being pulled this way and that, as is imagined by Newton. *They go along, as the ancients say, like blessed gods*....It is not right to say, because a stone is inert, and the whole earth consists of stones, and the other heavenly bodies are of the same nature as the earth, therefore the heavenly bodies are inert. This conclusion makes the properties of the whole the same as those of the part. Impulse, Pressure, Resistance, Pulling, and the like, are valid only for other than celestial matter." There can be no doubt (says Dr. Whewell) "that this is a very different doctrine from that of Newton." Having thus destroyed the fundamental propositions of the *Principia*, Hegel attacks Newton's grand conclusion (viz. that the celestial bodies are composed, like the terrestrial, of inert matter,) by the following irrefragable argument: "Doubtless both are matter, as a good thought and a bad thought are both thoughts; but a bad one is not therefore good because it is a thought."

Here I quit Hegel's comments and demonstrations. The extracts given above are not a mere idle digression; but have a direct bearing on the purpose of this section of the Preface.

It would be arrant folly, on the strength of these examples, to say that Hegel was a man without genius or intellect. The impression he produced, and still produces in one philosophical school of Germany, seems to prove that he was a man of genius. But the quotations above made (like a *reductio ad absurdum* in geometry) do prove that there must have been something radically false in the condition of his understanding, and in the principles of his reasoning; and they prove to demonstration the utter absurdities into which a man is led who entirely mistakes his own powers, and follows out false principles into all their consequences. In like manner, no one denies the reality of Oken's inductive discoveries, or refuses him his due intellectual honor. But this concession makes not his Physio-Philosophy one jot less absurd and monstrous; it only makes his psychological delusions the more lamentable. Neither do we deny to Strauss the possession of great learning and critical skill: but while he worships a pantheistic idol, it is impossible he should be a Christian, or feel the spirit of its teaching. Our Religion prostrates human nature to the dust, and gives it no moral power to fit it either for its duties here, or for the fruition of eternity, but that which it derives from a source external to itself—from a knowledge of God's law, and a sustaining grace enabling it to lead an accordant course of life. But Pantheism makes man to be all in all; at once the fountain of all truth and knowledge and the author of his own religion. Strauss could not, in such a state of mind, accept Christianity in its simple, pure, and natural form. Through his critical skill in handling the weapons of controversy, he has, in the opinion of his own school, utterly crushed the older Rationalists; who, by separating the plain historical facts of our religion from its miracles and mysterious doctrines, endeavoured to establish the former by denying and rejecting the latter. But when, on the principles of his Philosophy, he pretends to resolve all sacred history into a myth, and its doctrines into a set of phantasms or visions, conjured up and seen only within the mind of man, he reaches a depth of audacious folly in as direct antagonism with our reason and moral sense, as his Master's comment on the *Principia* is in antagonism with the firmest truths of material science.

If the academic student know little of the Bible history, or of its evidences, and still more, if he have little knowledge of its doctrines and its promises, he is in no state to encounter the subtle and destructive criticisms of Strauss. He may enter on a study of these criticisms with an honest spirit, and yet be defeated in detail, should he think that his Author is a man of free thought and unfettered by prepossession. But whatever may be Strauss' subtilty and learning, and whatever his profession of impartiality, "the spirit of the desired conclusion (the establishment of Hegel's philosophy) pervades the detail as well as the plan of all the earlier parts of the *Life of Jesus*: and in matters properly of historical or critical discussion, we constantly find the usual elements of such enquiries abandoned, and philosophical considerations invoked at every turn*."

---

* *Observations on Pantheistic Principles, &c.* by Dr. Mill. Cambridge, 1849.

But I affirm, once more, that his pantheistic Philosophy is false to reason and to human nature; and that all critical conclusions derived through the medium of this Philosophy, must inevitably be tainted (whether the Author may know it himself or not) by this first element of falsehood. Pantheism gives us not the sober fruition either of moral or material truth; but in its place, directs us to embrace an unsubstantial cloud: and if we wed ourselves to Ixion's folly, we must (according to the allegory of the ancients) have also Ixion's punishment, and end in an everlasting maze and whirl of unprofitable, heartless, and godless dreaming.

On these subjects I can no longer dwell; and returning to the more immediate matter of this section, I earnestly recommend the Cambridge undergraduates (and the undergraduates of this day are the representatives of the body at whose request I first published the following Discourse) to study the *Evidences* of Paley. His work is short and clear, appeals to the first principles of common sense and feeling, and forms a part of our established academic course. It is not, however, a very learned work, and may not on that account satisfy one whose delight is in deep learning; and it gives us none of the baseless visions of transcendentalism, and cannot therefore satisfy a Pantheist, or one who has drunk deeply at his ideal fountains: but truth is its aim, and common sense is its element, and it puts before the unsophisticated heart and reason a far more convincing weight of evidence than is found in any other English work. But our undergraduates must not be content with this. They must study the Gospel histories with an earnest and truth-loving spirit; and if they do so, they will rise from this study convinced more and more that the histories are artless, earnest, natural, and essentially true. The documents of our religion are put before us historically; and we must read and study the history if we wish to understand it. It is no right and honest study, if we neglect the history and only read a hostile comment. If this be the conduct of our minds, we are sure to end in scepticism or positive unbelief.

The appearance of Christianity is the greatest fact of history, and the canonical books of the New Testament are the authentic records of the fact. The first question, if we be in a state of doubt, is this—Are these documents substantially true? Now we possess a short work that does contain a subtle, and at the same time a true and honest forensic argument directly bearing on this first and vital question. It takes nothing for granted but that for which we have the evidence of our eyes; and it appeals only to those first principles of common sense whereby any man may form a judgment on a question of historical truth.

Let then the reader, if he have begun to doubt or waver in his reply to this great fundamental question, read carefully and seriously the *Horæ Paulinæ* of Paley, and he will see a proof nothing short of moral demonstration, that the book called "The Acts of the Apostles," is substantially a true history of facts and opinions; and he will further see that St Paul wrote all the Epistles which pass under his name and can be called historical, and taught the doctrines therein recorded. He will also see a proof which cannot be controverted, that St Paul, whether right or wrong, was a sincere, honest, and most earnest man, and that he thoroughly believed what he taught. And these conclusions virtually comprehend the substantial historical truth of the whole Gospel narrative—the very point for which we are contending.

We may, in this early stage of our inquiry, and after we have read the *Horæ Paulinæ*, disbelieve some of the doctrines of the New Testament; but we cannot believe with the school of Strauss, that its historical portions are nothing better than a myth. And if a man have gone thus far in the acceptance of Christian truth, he cannot in moral consistency remain where he is. Christianity is the faith of his fathers, and of his country. His civil duties are bound up in it; and it professes not to teach him things of trifling moment, which he has a right to overlook or put on one side; but it does profess to teach him what is of the deepest importance to his happiness and moral hopes. Let him then try to understand the sacred documents of the Old Testament: and here again he is supplied with a short work written on Paley's plan, which will teach him, with the force of moral demonstration, that a consistent thread of truth runs through the disjointed parts of the Old Testament, and binds them historically together*.

---

* *Undesigned Coincidences of the Old and New Testament*, by Professor Blunt. London, 1847.

He may perhaps during his progress see many things which, to his uninstructed moral sense, may appear difficult or repulsive. But even in the obscurest parts of these old records, and in their strange prophetic figures, he may learn to see the typified elements of the Christian scheme; and the plain shadows of coming historical events that unassisted reason cannot account for, but religion can. If he doubt all this (and though he begin his studies as a waverer, and waver long, he may yet see the whole truth at last) let him not lose himself among difficult and recondite works of critical learning; but rather let him read patiently and seriously the Sunday lessons of our Church from the time of Advent to the Ascension; and he may there see (on evidence against which neither the subtility of Hume, nor that of our modern Pantheists has any bearing), that whatsoever difficulties there may be in the way of Christianity, there are far greater difficulties in the way of positive infidelity. Let him also read some historical comment, like that of Keith*, on the prophetic oracles of the Bible, and then judge honestly for

---

* The copies of Keith's work have been sold by tens of thousands. Its great popularity is partly explained by the feverish anxiety which now affects the Christian public, to lift up the curtain that conceals our vision of the future. This anxiety, however natural, is not, I fear, very profitable. I have referred to this work because it compares the geographical and historical facts of modern discovery with the prophetic declarations of the Old Testament, and shews that these facts are in many instances the perfect and literal accomplishment of the old prophetic declarations. So much is, I think, completely proved in Keith's work. It may be read with pleasure and profit, and fully bears out what is said above, that though there may be difficulties in the way of our acceptance of the religion of Christ, there are far greater difficulties in the way of those who reject it altogether.

God, our religious principles, no matter how clear their first evidence, have no coherence or continuity, and will soon fall back into a state of moral chaos. If a man be sensual, irreligious, or careless of his moral health, he can have no moral strength against the plausible subtilties of Rationalism, or the pantheistic dreams of Strauss. Infidelity and sensuality are twin brothers. History tells us this, and our own experience may sometimes whisper it to us; and the Bible declares this truth in words too plain to be misinterpreted. "If any man will do His will, he shall know of the doctrine whether it be of God." Fanatical men may have misunderstood this passage. To do the will of God is to do our duty as social, intellectual, and religious beings, and not to fall short in any part of our appointed task. Sober philosophy accepts this declaration of the Word of God in all its fulness, and experience tells us that it is true.

The Apostles and first teachers of Christianity have been called impostors or enthusiasts, and therefore unworthy of belief. They were not impostors unless we can believe in historical miracles a thousand times more incredible than the miracles of the New Testament. We must believe that a few plain, earnest, unlettered men, fabricated a tissue of falsehoods which explained, perfected, and fulfilled, the complicated historical and prophetic documents of an older religion; and was also, when they began to teach, woven by a thousand threads into the history of the times in which they lived: which appealed to facts and incidents well known to the persons who were first converted, and made its way among unwilling hearers, and against all the efforts of national prejudice and civil power. The first teachers were not impostors, if we are ever to put trust in moral evidence. They had nothing to gain in this world. They preached holiness and inward purity; and they themselves led that life of self-denial they taught other men to lead. They had no secret or esoteric truths; but they expounded to their flock all they believed and all they knew. They taught the whole counsel of God without reserve. The God they believed in was a God of truth, and was to be worshipped in sincerity, and honoured by a life of truth. We still may listen to their teaching; for their writings speak to our moral sense, and tell us to *put off the old man, which is corrupt, according to the deceitful lusts...and to put on the new man, which after God is created in righteousness and true holiness. Wherefore, putting away lying, speak every man truth with his neighbour; for we are members one of another...Let him that stole steal no more...Let not the sun go down upon your wrath...Let no corrupt communication proceed out of your mouth...And grieve not the Holy Spirit of God, whereby ye are sealed unto the day of redemption. Let all bitterness, and wrath, and anger, and clamour, and evil speaking, be put away from you, with all malice. And be ye kind to one another, tender-hearted, forgiving one another, even as God for Christ's sake hath forgiven you.* (Ephes. iv). Men who thus lived and taught, could not have been acting through their lives but one continued lie. They taught, therefore, what in their hearts they believed to be true.

It was this faith which, under God, sustained them, and made them to go on as they had begun, and to be victors in their conflict with the world. Truth in its simplicity was the aim of their hearts; and with the world they made no compromise (however horrible the penalties that awaited them) by the sacrifice of one iota of what they believed true. They counted the cost when they undertook their task. Their Lord had died a death of ignominy and torture. They themselves looked for a like end, and their daily experience was in accordance with this anticipation. *Behold* (says St Paul) *I go bound in the Spirit unto Jerusalem, not knowing the things that shall befal me there: save that the Holy Ghost witnesseth in every city, saying, that bonds and afflictions abide me. But none of these things move me, neither count I my life dear unto myself, so that I might finish my course with joy* (Acts xx). And soon afterwards, while on the same journey, when his brother Christians, with prophetic dread of bonds and afflictions, besought him not to go up to Jerusalem, he replied, *What mean ye to weep and to break mine heart? For I am ready not to be bound only, but to die at Jerusalem for the name of the Lord Jesus* (Acts xxi). This is no solitary example. It is but a graphic representation of a great principle that ruled over the conduct of all the Apostles and early teachers of Christ. Impostors they were not, if there be such a thing as truth in history, or force in moral evidence. Enthusiasts they were, if by enthusiasm we mean the devotion of every faculty of soul and body to the cause they were sent to plead.

But if by enthusiasm we mean any moral obliquity, or unwillingness to see, and practically take up and carry out, the whole truth, so far as they comprehended it, we emphatically deny that they were enthusiasts.

The existence of Christianity is a great historical fact. How did it begin, and by what power did it win its place in the history of mankind? If we believe it true, we are at no loss for an answer to these questions. If we believe it false, we give up the best principles of historical evidence and moral truth, and we are baffled in our attempt to find any intelligible reply in which our minds can rest content.

Can we believe, with the modern Pantheist, that Christianity is a myth, a phantasm of the mind; and not a system of belief in substantial realities, which are proved by good moral and historical evidence? We can only grasp this conclusion by giving up those very elements of our nature without which we never could have learnt to apprehend any general truth whatsoever. Pantheistic philosophy turns the whole fabric of our knowledge (physical, moral, social, and religious) upside down, and deprives it of every single point on which it can rest with firmness. The general truths of morals and physics transcend the facts and evidences with which they begin; but are not, on that account, independent of them. A blind man may comprehend the principles of Optics, and by reasoning deductively from them might eliminate unknown optical truths: but the science of Optics never could have existed in the mind of man, but for the evidence of his eyes; and to this evidence he must again appeal by new experiments to be tested by the sense of sight, if he is to meet the demands of advancing knowledge. The ideal Pantheist forwards not human knowledge (social or physical); but clogs it and bewilders it, by an inflated, hazy, metaphysical creed; which so blinds the intellectual sense that a man can neither apprehend a plain inductive truth in physics, nor a plain moral truth gathered from the experience of what human nature is, nor a plain inference from those first elements of historical evidence, without which men could have neither knowledge nor profit from the records of past time. But the Pantheist not merely blinds the eyes of common sense and reason, but he has a language as deformed as his creed. He wars against good taste, elevates into realities the phantasms of his brain, and fills his pages with a monstrous unwieldy jargon, a confusion of tongues worse than that of Babel, which is abhorrent to any soul that loves simplicity and truth. England will not long endure this turgid and cloudy jargon. Her pure philosophical diction has indeed undergone a slight damp suffusion from this new pantheistic vapour: but the warm sun of a better day will drive it off; and it will not long, we trust, be suffered either to obscure our language, or dim the bright surface of moral and religious truth[*].

---

[*] I add this note, during the passage of these pages through the press, that I may not be blamed for using vituperative words without giving any reason for them. Few men have had a power over the English tongue more magical than that of Coleridge: but in the latter years of his life his philosophical essays sometimes became obscure and disagreeable, from his use of words, or turns of thought, he borrowed from the German philosophy: and there are some modern writers of great power, who seem as

The early teachers of Christianity appealed to the sacred books of their countrymen. We have these books still, and can sift their evidence. So far we are on a level with the first Christians; and in some important matters of belief we have, so far as regards this evidence, a great advantage over them. But the Apostles appealed to the teaching and miracles of their Saviour, to whom they had listened, and with whom they had lived; and they proclaimed themselves the witnesses of His resurrection. This was their starting-point. They began with signs and wonders, and they were the wit-

---

if they could never find in their hearts to express themselves as Englishmen used to do. If the Germans are before us in any parts of philosophy, we may be compelled to adopt some of their technical language; but we have no need to smother our own language under it. The reader will, I trust, bear in mind, that the remarks in the text relate not to German philosophy (truly so called); but to the abuse of it, especially when it passes into the type of Pantheism. The philosophy of Locke led to Materialism; that of Kant to Pantheism; but the two leaders are not to bear the blame of all that has been done by their followers.

All knowledge, psychological as well as material, is in its rise and early form, empirical and inductive; and our good old philosophical language constantly shews us the marks of this truth. There is a symmetry and congruity in its general terms, even when they are made use of to express the highest points of general knowledge we have arrived at: for they remind us, in their form and derivation, of the steps by which we have reached the level on which we stand. But a Pantheist denies the inductive method, and seeks only for general truth within the recesses of his own mind. He strives therefore to drive from his thoughts the steps by which he gained his general knowledge, and to discard, as far as may be, from his language, those natural expressions that remind him of a truth he chooses to shut out from his belief. Hence, he is positively constrained, by his own principles, to invent a new technical form of words, to describe the emanations and phantasms of his brain; and as his philosophy is not that of nature, neither can his language be simple and natural. Pantheism, therefore, leads to a cloudy, cumbrous, and hypothetical diction: and the worshippers in that school have their metaphysical devotions fed and stimulated by the ideal mists (what Milton calls the "Majesty of darkness") that circle round the idol before which they worship.

nesses of great miracles. But they told not their countrymen of things done in a corner. They began to teach the religion of Christ in that city where he had suffered a public death a few weeks before, and in sight of the mount from which he had ascended a few days before. They first addressed their countrymen at the time of a great public festival, which tens of thousands had come to celebrate from all the provinces of Judæa, and from many distant parts of the world. Multitudes, as we know, believed. Many of them, no doubt, had heard the teaching of Jesus, and knew something of His life and miracles; and had therefore their hearts prepared, and their eyes partly opened, for the reception of a new and better light; and all of them were constrained by the manifestation of powers which could only come from God. They believed, and became the living members of the Church. But the nation believed not; for the new doctrine was humbling to individual pride, and destructive of their cherished hopes of national glory. The followers of Jesus, as He had foretold them, were soon the objects of bitter persecution. Time went on, and the primitive teachers addressed themselves not to Jews only, but to proselytes (both "of righteousness and the gate"), and to heathens of every country. We know the subsequent events. Jerusalem and its temple were utterly destroyed, and the descendants of Abraham were driven as outcasts among the nations of the earth. But the followers of Jesus continued to gain fresh conquests, and in about three hundred years Christianity became the established religion of the Roman empire.

But with what weapons was this great conquest won? Not by the arms of the flesh; for these arms the Christians were not allowed to wield; and they taught no flattering philosophy, but a doctrine most humbling to man's pride: they found therefore no co-operating strength in the philosophy of their own times. They taught a life of self-denial, of humility, of gentleness, of charity, and of purity: and hence it was that their doctrines were in early conflict with the licentious worshippers of heathen gods. In the heathen sense of mystery, they had no mysteries; they had an appointed order of overseers, elders, and ministers, (bishops, priests, and deacons) to perform their simple ceremonials, to instruct them, guide them, and watch over their spiritual health: but they had no sacrificial priesthood; and the very name of priest (ἱερεὺς) was at first unknown amongst them. They had indeed their rites (and they had also their mysteries, in the Christian sense of mystery), but they were few and simple. They had their rite of admission into the flock, and their rite of commemoration, whereby they kept alive, through visible symbols, the remembrance of the death and passion of their Lord. These rites were done, under divine command, as acts of faith and obedience, and had therefore the promise of a spiritual blessing. They were also sacramental in the Roman sense:—one was a solemn pledge that the neophyte would be true to the banners under which he engaged to fight:—the other was a renewal of his solemn pledge, and a public declaration that he was still true to it, and would continue "Christ's faithful soldier and servant unto his life's end." But they had no gorgeous pageantry or sacerdotal pomp to captivate the senses. The gorgeous temples of the gods, their incomparable sculptures, the symbols of heathen art and imagination carried to the highest grade of sensual and ideal refinement, were held as nothing, or worse than nothing, by the early followers of the Apostles. Hence also it was that the heathen multitude (far more, at first, than the heathen magistrate) rose up against them, and tried to crush them.

But God was on their side, and they went on adding to their numbers, till they were denounced as dangerous to the State. Whether these early Christians were truly thought to endanger the safety of the State, is a question of no moment. A test of their loyalty was offered to them;—they were called on, and they refused, to do religious homage to Cæsar. On this account they were proclaimed guilty of treason, and underwent the direst punishments that the malice of an inflamed idolatrous multitude, and the jealousy of a heathen despot, could inflict upon them.

Every fact of authentic history proves that the early Christians, whether they were right or wrong in their belief, were upright men who held that they were the servants of a God of truth, and that no motive under heaven could justify them in violating the sanctity of truth. This is the grand point for us to prove, and history proves it with the force of demonstration. How easily they might have tampered with their consciences, and said that the homage done to Cæsar was a political and not a religious act—that this was the sense in which a heathen did his homage—that no Roman believed his monarch (a man like himself, and too often a very ignorant, brutal, sensual man) was in truth a god. But the Christians would not thus tamper with their conscience. Their reply was, like that of Peter and John to the Jewish Sanhedrim, "Whether it be right in the sight of God to hearken unto you more than unto God, judge ye." They refused to do religious homage to Cæsar. Truth was to be upheld at whatever cost: and the God of truth they could not worship by a lie. Again and again it seemed that the powers of darkness were about to overwhelm them. They were "perplexed, but not in despair;" they were "persecuted, but not forsaken;" they believed in the promises of their God and Saviour; they did in their hours of bitter trial what the Apostles had done before; they fought the fight of faith, and it was the will of Providence that they should gain a victory over all the powers of darkness.

The heathen multitude had no mercy. They had been trained to the love of blood by bloody celebrations; they had been trained to sensuality by bad examples, and by a sensual and voluptuous idolatry; they hated the purity of the simple and self-denying Christians; their souls were glutted to nausea with old sights of bloodshed; and, to satisfy their cravings, they wanted some new form of human suffering. The magistrate, more merciful than the heathen mob, would sometimes interpose to save a venerable sufferer like old Polycarp (to quote one example among many), by feigning a confession not made by the martyr's lips. But the faithful Christians, of these hard days, were like their Master and his first followers. They neither confessed with their own lips what they believed not true; nor, while they heard the roaring of the beasts by which they were to be devoured, or saw the faggots by which their bodies were to be burnt, would they allow the magistrate to feign in mercy a confession for them.

Such, for nearly three centuries, were the attestations of Christian truth, and such were the weapons by which the Christians won their battles. If we believe in Providence, and believe that these men taught only what they had a divine commission to teach, and what in their hearts they believed true, then have we a full explanation both of their conduct and of all its consequences. They began their teaching by an appeal to facts about which they could not be deceived. They made these asserted facts the very foundation of their whole system of teaching. If these were not true, they were a set of impostors. But if we accept this alternative, what follows? We must believe in a systematic conduct out of all analogy with what we know of human nature, and in a series of consequences that mock the whole experience of history. We must believe in a consistent and long-continued series of miracles, moral, social, and historical.

Gibbon* has well described some of the secondary causes which, under Providence, led to the propagation and final establishment of Christianity; but his account fails in some of the essential points of a true and philosophical history. It gives us no right conception of the evidence on which the first Christians acted, and of the feelings which carried them on; neither does it give us any knowledge of the grand simplicity and moral purity of the doctrines taught by them. To these subjects his mind's eye was closed, for he was an unbeliever; and to fortify his unbelief, he delighted to dwell upon the follies and aberrations of the primitive Christians. But had there been no follies and strange delusions among them, their religion would have wanted one test of its truth; for these were among the things predicted in the sacred records on which Christianity is built, and with which it must stand or fall. He read the history of the Church of Christ with a never-ceasing curl upon his lip. The demon of impurity haunted him, and the stream of historic truth was polluted by the taint of his imagination. In such a state of mind it was not possible for him to comprehend the moral purity of the Gospel, or to do any adequate justice to those men who were God's instruments in conveying it to mankind. His vast learning and general fidelity we do not pretend to deny. Neither would we affirm that he did not do his best to put before us the causes of the spread of Christianity; but we do affirm that he was morally and intellectually disqualified from being a good and true historian of the religion of Jesus.

---

* *Decline and Fall of the Roman Empire*, c. xv.

We may, however, use Gibbon's History for another purpose. It may help us to compare the conquests made by the followers of Jesus, with the conquests made by other men, during a period of revolution and change extending over fifteen hundred years.—The victories of Mahomet were the victories of a fierce, fanatical, and sensual soldiery over nations weakened by a bad polity, and too often (though called Christian) degraded by superstition. There is nothing supernatural in such victories as these. And what have been the consequences of the establishment of the religion of Mahomet? It has never lent itself to the progress of mankind in learning, sound philosophy, good polity, or civil freedom. But it has desolated some of the fairest regions of the earth; and, at this moment, its empire is ready to crumble by its own weight, and is upheld only by the mutual jealousies of the Christian powers around it.—The victories of Tamerlane were still more rapid and astonishing. His murderous armies spread from one side of Asia to another like a desolating wave, which at one time threatened to overwhelm the whole of Christendom. But it broke on the shores of eastern Europe, and then rolled back again and spent its last fury in central Asia. It was stayed by the hand of God; for Tamerlane died, and no man was raised up to follow out his conquests.—Or we may take a Christian example (if indeed it deserve to be called Christian), and mark the progress of the Crusaders. All Europe seemed, at the time, to be under one great spasm of convulsive energy, and to have its passions borne towards one point of maddening interest. The Crusaders were as fierce, and alas! often as licentious and fanatical as the followers of Mahomet. They gained great victories by the might of numbers, and by military courage inflamed by fanaticism; but they neither knew nor practised those lessons of mercy and forbearance their religion should have taught them. And what followed? The tide of conquest turned back upon them; and in less than a century they were driven out with shame from that Holy City they had won by violence and bloodshed.

Victories like these have no similitude to the great moral conquest won by the first followers of Jesus. Christianity stands by itself in the history of our race. Its beginning, its progress, and its continuance, are all removed above vulgar nature, and admit of no explanation from the events in the common history of our race. It lives and flourishes still, and will live to the end of the world—the nurse of domestic happiness, the mother of our peace and joy, the fountain of all virtuous resolves, the true source of national glory: and in the prophetic visions that are unfolded to him, and in which he firmly believes, the Christian historian can tell us that the gates of hell will not prevail against the religion that was founded by his Saviour.

The glowing words of the older Prophetic books, in which are prefigured the moral triumphs of the reign of Christ, have often been put in very painful contrast with the present miseries of the Christian world; and have perhaps been the means of leading some men into scepticism, or a more positive state of unbelief. But we ought surely to make some reasonable allowance for the poetical and figurative diction of the Old Testament;

and in the prophetical portions of the New Testament there is no promise to the Church of an exemption from the social miseries that still afflict the human family. The world is the place where men are trained and proved, and not their place of final triumph. Christianity was from the first but a remedial scheme, and it is so still. Its triumphs are for another world. Human nature is still what it was before the coming of Christ; and we can have no right claim to a fruition of His promises, if we accept not the conditions under which they have been offered to us. If the world practically denies the doctrines of Christianity, it has surely no right to point to the existence of social misery as an argument against our religion. An honest Christian, whatsoever evils may surround him, never complains of the broken promises of his Saviour; and what shadow of right has any man, who has not heartily accepted Christianity as his rule of life, to complain that its benefits are not fulfilled in his own person?

But, after all, we may affirm (with confidence from the past, and good hopes for the future) that Christianity has already done much for the good of our fellow-men. It has driven slavery from our homes; not by positive institution or direct command, but by the genial influences of its pure morality and the indirect power of its doctrines. It tells us, that every son of man is our brother, and has a right, not merely to the best offices of good-will and charity, but to a full participation in the blessings of that religious truth which is the foundation of our social happiness and of our hopes of heaven.

If any nation upon earth practically deny this truth, it thereby denies the fundamental principles of Christianity, and deserves not the name of Christian; and under whatsoever form of government it may be held together, and whatsoever boast it may make of civil freedom, it knows nothing of the spirit of the Gospel, and little of that liberty wherewith Christ hath made us free, while it nurses and maintains within its bosom the elements of the most deformed despotism that has ever afflicted the race of man.

Christianity has bound society together by a thousand endearing links, that were never felt before its promulgation. Monuments of charity, unknown among heathen men, have risen up around us. Our domestic fabric, with all its faults, is far more pure and lovely than it was in the boasted civilization of Greece and Rome. Woman has now her right place within the world; and a Christian household is the abode of peace and love, and the best school of every social virtue. The principles of honour (the code of worldly men) have been exalted and refined by the indirect influences of our religion. Revenge and ambition are no longer decorated in poetry, or adorned in history, as they were of old, under the name of virtue. Religious wars have, we trust, ceased for ever. If religious conquests be hereafter made, it must be by the voice of love and persuasion—by the weapons used by the Apostles of our Saviour. War, alas! has not ceased; but horrible as it is, it is not so horrible as it was of old; and it ends not now with the hopeless slavery of the vanquished. It is denounced by all reasonable men, not merely as the frightful scourge of humanity, but as the plague of all civil progress, the destroyer of the wealth of nations, and the worst enemy of true philosophy, of learning, of science, and of all those qualities that minister best to social happiness and national honour. The study of Nature, and the religion of Nature based upon that study, are among the appointed means of enabling us to comprehend the will of God, and to do our duty here. Revealed religion has a still higher aim; but the two religions are not in conflict. Christian philosophy loves not a one-sided and narrow creed, but embraces every truth, and loves it for itself: for truth is a manifestation to the mind of man of the will of that Almighty Being who made him and redeemed him, and has put before him the means of social happiness and the hopes of future glory.

Dr Johnson tells us, in one of the Papers of his *Idler*, that "when the philosophers of the last age first congregated into the Royal Society, great expectations were raised of the sudden progress of the useful arts; the time was supposed to be near, when engines should turn by perpetual motion, and health be secured by the universal medicine; when learning should be facilitated by the real character, and commerce extended by ships which could reach their ports in defiance of the tempest."

"But improvement is naturally slow. The Society met and parted without any visible diminution of the miseries of life. The gout and stone were still painful;

the ground that was not ploughed brought no harvest; and neither oranges nor grapes would grow upon the hawthorn. At last those who were disappointed began to be angry......and the philosophers felt, with great sensibility, the unwelcome importunities of those who were daily asking, *What have ye done?* The truth is, that little had been done compared with what Fame had been suffered to promise[*]," &c.

Ninety years are gone since these words were written; and within that period Science has brought to light so many hidden powers of Nature, and contributed so largely to the embellishments and comforts of life that no utilitarian philosopher now thinks of repeating the scornful question, "What have ye done?" Could Johnson have heard from the whisper of some prophetic seer, that before a century was over (although oranges and grapes refused to grow upon the hawthorn), fruits that grew within the tropics would be sold at the market-stalls of London, and for a price not much above that of the common produce of our orchards—that the gout and stone, if not subdued, would be palliated—that operations, too horrible to be named, would be performed by the surgeon's knife without one shriek of agony and while the patient was enjoying a pleasant slumber—that commerce would be extended by ships which, urged through the sea by a power they carried within themselves, had not to wait for the fickle winds, and that "they *could* reach the ports in defiance of the tempest" —that the very words an author was preparing for the

[*] *The Idler*, Saturday, December 22, 1759.

London press might, with the velocity of lightning, be sent through the air to the capital of Scotland, and there also be set up in type; and that, if he thought fit, the author might go down the same day to Edinburgh and correct for himself his duplicate proof-sheets before they went to press—had Johnson heard all this, he would perhaps have thought that he was listening to a lying oracle; but had he believed the seer, he must have softened his complaint—"that Science has the power of doing little in comparison of what Fame had been suffered to promise."

Without indulging in any rash anticipations, may we not derive good hopes from the progress of physical discoveries, and still more from the progress of social discoveries and a cultivation of the arts of peace, and believe that a higher Christian civilisation will gradually unfold itself?—That men, before many centuries are over, may, under God's help, so heartily accept religious truth that they may learn to keep down the rebellious elements of their nature—that Christianity, with all its high and holy principles (not seen through the mists of a base philosophy, or disturbed by the taint of social immorality), may at length triumph as it ought to do, and produce those glorious predicted fruits, which will be at once its full earthly accomplishment and the surest evidence of its truth? This may perhaps be called a day-dream; but it is a pleasant one, and I should grieve to part with it.

In concluding this short outline of the nature of Christian Evidences, I may remark, that our religion must always find antagonists in the pride and bad passions of mankind. During the last century a philosophical Deism was put in opposition to Christianity. It is not Deism now, but Atheism, that is to triumph over the religion of Jesus: but, fortunately for the cause of sacred truth, the pantheistic visions, at this time offered to the credulity of mankind, are as directly opposed to the first principles of inductive science, as they are to the historical proofs of our religion. Whether the New Testament be true or false, it has not, when taken collectively, and examined honestly, the least similitude to a mythical book.

St Luke wrote the book called the Acts of the Apostles; and we can prove, with the force of moral demonstration, that it is substantially a true and honest history. His Gospel is a compilation; but he tells us that he had diligently sifted the accounts delivered to the first Christians by the men "who from the beginning were eyewitnesses and ministers of the word;" and that his own history was written for the express purpose that his Christian readers might know the certainty of the things wherein they had been instructed. Keeping out of sight any arguments based on the inspiration of the New Testament, and (for the sake of argument) treating this Gospel as a common historical document, we have the highest internal and moral evidence, that St Luke believed it true, and we know that it was so accepted by the early Christian converts to whom (through the person of Theophilus) it was first addressed. We can conceive it possible that on some points he might have been misinformed: but we cannot conceive it possible that his Gospel could have been published as a pantheistical myth.

Myths are the embellishments of an established belief. The heroic traditions of the heathen world may have been partly true, and partly false: but they became gradually covered and obscured by mythic decorations, when men had fallen into the fooleries of hero-worship. Hence, our old historical myths were published long after the period of the events and the persons they pretended to celebrate. Myths do not make a creed, but presuppose it and embellish it; and do not immediately, but gradually, gain their currency, as they fall in with the legends of a popular superstition. But the Gospel history was current during the time of the Apostles, was circulated among men who lived during that time, and knew the events described in the history. It was publicly circulated among those men, not to support any philosophical theory, and to decorate a popular belief; but without any philosophical theory, and in spite of an opposing popular belief. It was acted on, as if it were true and historical, by those who proclaimed it to mankind, and by those who accepted it: and on the very strength of its being true and historical, and by nothing else, did it undermine the established and mythical religion of the civilized world.

The Gospel has none of the historical conditions of a myth. Had the Apostles been a set of dreaming, moon stricken philosophers, like some of Hegel's followers—deniers of a personal God, the Creator of the heaven and the earth—deifiers of man, and the priests of a new, flattering form of hero-worship:—then, perhaps, the mythical hypothesis of Strauss might have had some similitude to a reasonable theory. But such were not the Apostles of our Saviour, and such was not the rise and progress of Christianity.

As the Hegelian philosophy destroys the logical foundation of all material and scientific knowledge, by pretending to evolve particular truths, independently of experience, only out of the general conceptions in the mind of man; so Strauss, the apostle of this philosophy, inverts the whole order of historical truth. According to Strauss, the mythical conception of the Gospel preceded the historical; and, in the spirit of the same philosophy, he maintains that nothing can be higher in nature than the conceptions formed in the mind of man; and that miracles, wrought by any power exterior to man himself, are therefore impossible. This seems to be the starting-point of his philosophy; and what is it but Atheism invested with the cloke of transcendentalism to cover its naked deformity? We affirm in reply—that there is not the shadow of evidence for the existence of any form of philosophy among the first Apostles out of which a mythical Gospel could have sprung—that the first conception of Gospel-truth was historical—and that in no other form was it first believed, or could have made any progress among men.

It is not true, but it is historically false, that Christianity sprang up and gained belief, as a mythicized form of oriental philosophy: but it is true, that the simplicity of Christian truth was, in ancient times, obscured by some bad teachers, who deformed its surface by an incrustation of oriental philosophy. And it is true, in these days, that our belief in the being of a God, the best hopes that are bound up among the elements of our moral nature, and the plain facts of historical evidence, are all to be swallowed up, disintegrated, re-digested, and sent out anew, as a kind of living spawn upon which ideal Pantheism is to incubate, and hatch whatsoever monstrous forms it pleases. There can be no social or practical wisdom among men while schemes and fantastical visions of this kind have any currency among them. In their license of speculation, and in their dogmatic contempt for the more sober conclusions of inductive reason, as well as for revealed religion, they may boast their intellectual liberty; but we may safely predict that they will never build any lasting monuments of social wisdom, or be the true friends of civil freedom. They may call themselves philosophers; but by casting away the lessons of experience they have practically put themselves back into a state both of moral and social childhood.

One set of opinions I have endeavoured to keep steadily in view through the long discussions of this Preface. I have contended, that all sound philosophy begins by the inductive method, and that we can never sever it, with safety, from its logical and chronological history—that we have a proof of the being of a personal God involved in the elements of our nature—that the exercise of a Creative power in nature is not incredible, but certain—that the exercise of a miraculous power is not, therefore, incredible—that we have a grand cumulative historical evidence for the truth of revealed religion—that we have a great additional internal evidence from its lessons of self-denial and its pure morality—and that we have also a grand external evidence for its truth derived from the history of its propagation, and from its effects on the civil progress of mankind.

Analogy supplies us with another important argument for the truth of revealed religion, which ought, properly, to have appeared in an earlier part of this section: but it is so distinct from all other arguments, and at the same time so important, that I have removed it from what might be thought its more natural place, and added it as a supplement to the preceding remarks on Christian Evidences: and I wish the reader still to bear in mind, that I pretend not here to give a treatise on Christian Evidences, but only a series of short hints, thrown out in sincerity and good-will, for the student's guidance; and it matters little in what order they are put before him, if they be only fitted to give a true aim to the conduct of his mind, in the study of the gravest questions that can ever be submitted to him, and on the right determination of which will depend a great portion of his social happiness, and all the reasonable hopes he can ever have of living hereafter in his Maker's presence.

Arguments from Analogy.

The Deist believes in a God of Nature. The Christian believes in the same God, and admits the first principles of the Deist; but he also believes that God is the author of Revelation. If this be true, we may look for some analogy between God's dealings with man in the world of Nature, and his dealings with man in the system of religion offered to our belief; for experience tells us that all Nature, so far as we comprehend it, is on a consistent plan. Every analogy of this kind, fairly made out, is a positive argument for the truth of our religion, and may help to win over the Deist to the side of Christian truth. Again, there are formidable difficulties in the way of our full acceptance of Christianity as a system of belief and a rule of life. No one pretends to deny this. But if it can be shewn by analogy, that the same difficulties present themselves in the religion of Nature, then may we confirm the wavering Christian; for these very difficulties supply him with an analogical argument in favour of his religion. And by the same argument we may perhaps convince the Deist; for he cannot, as a consistent Deist, rest content among great and unresolved difficulties; and he must either come over to the Christian side, or seek his refuge in an extinction of all inquiry, or in downright Atheism. But we have little to fear from a passive philosophical scepticism; and we have nothing to fear from Atheism, for it is abhorrent to the nature of man. It can exist, as a negative form of belief, only in the mind of one who is in a state of moral mutilation; and can never (except indeed under some masked form of Pantheism) be dangerous to the public faith. Such, in a few words, seems to be Butler's argument in his great work on *The Analogy of Religion Natural and Revealed*.

His argument is perhaps difficult to grasp, from the severe and unimaginative, but truth-loving spirit in which he has placed it before the reader; and I have heard some very able men declare that they had endeavoured, in vain, to feel the force of it. Let me then do my best to clear the way, and (without pretending to follow the order of his reasoning, or to give his exact illustrations) to sketch in a few sentences the nature of his argument; in no fond hope of satisfying the reader, but in the honest hope of leading him to a patient study of Butler's work.

(1) Revealed religion tells us of the unity of the Godhead. Nature proclaims the same truth: but at the time our religion was published for the acceptance of mankind, this great truth was not commonly believed and well understood even by learned heathens.

(2) Revelation tells us that God created the heaven and the earth—that man was the last created of living beings—and that God then rested from His labours. Many learned heathens held that the order of nature, animate as well as inanimate, had been from eternity. Modern science gives us the truest elements of the Religion of Nature, and proves that the order of Nature has not been eternal, and that man is a creature

of the last and latest period. Science also tells us, that since the appearance of man, creative power in Nature appears to have been at rest. That there are difficulties in the interpretation of the opening words of the Book of Genesis, we do not deny. To bring them into a literal accordance with all the phenomena in the past history of Nature would imply, on our part, a perfect knowledge of the past history of Nature; but such a knowledge we have not. The progress of science may clear up these difficulties, and the discussion of them has no fit place here; for the argument from analogy can only be drawn from facts that are clear and well established. We may however very safely go one step farther. There appear to have been many successive acts of creation (whether they come within the meaning of the opening words of the Bible, I do not here inquire), all on one great organic plan; and, so far as we can comprehend them, they seem to have been in accordance with the successive conditions of the earth. If this be true, we have an analogical argument, not only for the prescience and power of the God of Nature, but also for His continued providential government.

We may go further still—we may draw from the natural history of the earth, analogical arguments in favour of Revelation. For if God have brought all animated Nature into its present condition by successive acts of creation, which have become incorporated, from time to time, in the system of Nature; Why may we not suppose that he has dealt in the same manner with the moral part of Nature? Why may we not suppose that by extraordinary acts of His moral government, (such e. g. as the supernatural promulgation of a religious and moral code) He should in a like manner deal with the moral part of Nature, and bring it, from time to time, towards a higher grade of perfection?

(3) Revelation tells us that God is omnipotent and omnipresent. Nature proclaims the same great truth. The more our knowledge becomes extended, the firmer is our grasp and conception of the existence of universal law; and law is the natural expression of God's presence. All Nature is comprehended in it, and no parts of Nature are exempt from subordination to it. Even in those parts of visible space which we sometimes speak of as vacuities, are the media through which countless material actions pass unceasingly, and thereby connect together and under one system of general law, all parts of Nature animate and inanimate. All known laws combine together in one vast consistent plan, the *archetype* of which exists only in the will of the Creator.

(4) Our Religion tells us that the moral scheme, of which we form a part, is progressive, and does not end here. Nature seems to tell us the same truth. Past Nature has been progressive, as we learn from the records of the earth. We may then believe that she has reached no eternal resting point, but may be progressive still. That which is present has sprung from moral and natural laws impressed on Nature by the power of God. That which is to come may in like manner, and in subordination to the same controlling

power, spring from the present, and be progressive still.

(5) We may extend the previous statement—Our religion tells us that the present is a preparation and a training for something higher and better. This truth is shadowed out (faintly it may be) in the religion of Nature. We see proofs of the benevolent and wise care of God in the structure of our bodies: but we see also the sure marks of prescient and prospective wisdom and design. For example, within the womb every child of man has breathed by a single heart; but during that state of being a double heart was laid down and perfected by the hand of Nature. This heart first begins its appointed task when we pass into the air: all that passed before was but an organic preparation for a new and higher condition of existence. We may then believe, on a true analogy, that our moral existence here is but our moral childhood, and that if we obey the moral laws a prescient God has impressed on our souls, we shall reap the fruits of this moral preparation in a new and more glorious existence. The same truth seems to be shadowed out (but perhaps more feebly) in the progressive development of religious truth, of human polity, and of art and science.

(6) Revealed religion tells us of a future state of being. This is the grand truth of our religion, without which it would have no meaning. The religion of Nature gives us a conception of a future state and a longing for it; but leaves the soul in perplexity and doubt. But we do know that all Nature, so far as we understand it, is on a harmonious and consistent plan.

If then our conception and desire of a future state is to have no fruition in futurity, then is Nature out of harmony with herself—Man loses one of the elements of his peace and happiness—Nations lose the best element of social peace and security. The religion of Nature does therefore prepare us for an acceptance of the great fundamental truth of revealed religion.

(7) Revealed religion tells us of God's law and of its penal sanctions. Analogy proclaims the same truth in the religion of Nature. The God of Nature is a moral governor, and deals throughout all Nature in penal sanctions. All society is upheld in subordination to this fact, and society is the creature of God; for it is but the natural offspring of the very laws He has impressed on His creatures. Crimes and punishments are words that stand out in every social code since man lived as a social being on the earth. Misery, independently of all human law, follows in the train of sin — national degradation in the train of national crimes and offences against the great moral laws of Nature. Analogy is here complete, and fails not in one jot of its full evidence. What we have said of punishments may also be said of rewards. They are a part of God's dealings here. We sow in one season, we reap in another.

(8) Our religion tells us that the Author of our being is plentiful in goodness, but it conceals not the sterner attributes of the Godhead. It tells us that the God of Nature is a God of vengeance and of justice. Nature abounds in merciful dispensations, and we see

among the laws of Nature no mechanism or contrivance for securing physical misery or social evil. But under the government of natural laws we do see grievous examples of individual suffering; and the natural and social punishments for violated laws are palpable and terrible. We dare not therefore set up one attribute of the Godhead at the expense of another, or count on the mercy of God by extenuating his severe justice. On painful and difficult questions like these, there is the strictest analogy in the teaching of natural and revealed Religion.

(9) Our religion tells us that the punishment of crimes and follies ends not with their first authors, but descends even to remote generations of the human family. However harsh this may seem to uninstructed reason, it is an unquestionable law of Nature.

(10) We learn from Revelation that man is fallen from the high moral condition in which he was first created. Nature seems to proclaim the same fact: for this, at least, she tells us—that neither individuals nor societies ever reach that perfection which, as they themselves allow, would best become their moral attributes, nor conform consistently to those laws which natural reason pronounces to be right and good. But natural religion points out no adequate remedy for the frightful evils of society. Revealed religion gives us the remedy and its proper sanction.

(11) Revealed religion tells us that the evils of society are the very means whereby a man is carried through a state of moral discipline and probation. The

religion of Nature tells us that the best and purest virtues of society spring out of the darkest and most painful conditions of humanity, and that without these conditions the best graces of moral life could have no field for exercise, and therefore no vital being.

(12) The preceding analogy may be carried much farther. If we believe in a God of Nature, the evidences of religion, considered as matters of fact, are credible if they conform to the constitution of Nature. A sceptic may say, "that the proof of religion is involved in such difficulties as to render it doubtful; and that it cannot be supposed, that, if it were true, it would be left upon doubtful evidence."* To this Butler replies, "that from the constitution and course of things, we must in our temporal concerns, almost continually, and in matters of great consequence, act upon evidence of a like kind and degree to the evidence of religion." ..."The unsatisfactory nature of the evidence with which we are obliged to take up, in the daily course of life, is scarce to be expressed; yet we do not throw away life or disregard the interest of it, on account of this doubtfulness"..."The question is not at all, whether the evidence of Religion be unsatisfactory to a sceptic; but whether it be, in reason, sufficient to prove and discipline that virtue, which it pre-supposes. Now the evidence (of Religion) is fully sufficient for the purposes of probation; how far soever it is from being satisfactory for the purposes of curiosity." And (as Butler adds) it answers the purposes of probation far better

---

* Butler's *Analogy*, Part II. cap. VIII.

than it could do if it were as demonstrative and overwhelming as the sceptic seems to require. Were all social, moral, and religious truth, demonstrative, there would be an end of prudence in social conduct, of wisdom in legislation, and of faith in religion. As then the difficulties in life, arising out of the course of Nature form an essential part of our moral and social discipline, so the difficulties in the evidences our religion may afford us a like religious probation. This analogy, seems to be well-founded. In the difficulties of life some men fail utterly, and are ruined both in their social and moral condition. And so it is in our religion. But if we submit to our probation with fair and honest minds, we believe that God will help our convictions, and turn them into that which religious men call *faith*.

(13) The whole scheme of our religion is remedial. Is there any thing in this conception out of analogy with God's dealings with us in the natural world? Certainly not. We might almost say that, under Providence, the whole fabric of human knowledge and society is remedial. We toil to satisfy our wants; we invent remedies for disease; we frame laws against aggression. In every corner of society we see traces of our fallen condition—of natural and moral evils, and of remedies to palliate or remove them.

(14) The religion of Christ was only matured after many centuries of preparation, was slowly received among men, and is now but partial in its visible benefits. And so also God deals with us in the natural world. Discoveries, however important to the race of man, long

remain concealed, spring up gradually, and after they are published are neither universally known nor accepted. The discoveries of art and science, and the best inventions of social life, are all of them examples in point. For thousands of years the surgeon's knife (though used in mercy) was a terror to poor suffering humanity; but those terrors, (thanks to the God of Nature!) are now almost passing away. Spite of the social ill around us, we may hope for better times, when the light of our religion shall brighten the whole earth, and all arts and sciences shall be her willing handmaids.

(15) Our religion tells us of a vicarious punishment undergone by Jesus Christ in our behalf. It tells us that one man suffered for the good of many—that the death of Christ was accepted as a sacrifice, &c. &c. What was the nature of Christ's person, and how these benefits were brought to pass, are not my present objects of inquiry. The doctrine alluded to has, as we know by experience, often been rejected, and considered too hard to be believed; but this we may assert respecting it,—It is not out of the analogy of Nature. What is Nature but God's providential law shewn in his government of the natural world? And we have examples, by thousands, of men, who on the highest principles of humanity, have endured bodily loss and suffering for the good of their fellow-creatures. The whole course of Nature tells us that we are in the hourly fruition of benefits we reap through the mediation of others, and of advantages we derive from the toils and bodily sufferings of others. Natural religion tells us that a great

personal sacrifice, made on principle and for the good of our fellow-creatures, is the most glorious example of social virtue. Neither have we any right to say, that a sacrificial offering is abhorrent from the first principles of natural religion. Nearly all forms of religion, within the known periods of history, have had their sacrificial offerings. Might we not thence infer that such offerings were the natural suggestions of the mind, and therefore a part of natural religion? We may however take another view, and perhaps suppose that all such offerings have been the natural consequences of some common tradition. But whence could this ancient tradition come, so as to gain so powerful and permanent an authority? The only intelligible answer to this question seems, on this view, to place sacrifice on divine authority; and therefore, so far, destroys the objection to any doctrine implying a sacrificial offering.

(16) Our religion enjoins prayer and other spiritual duties, strongly distinguishing them from ordinary, moral, or social duties. The religion of Nature enjoins the same, in a language too plain to be misunderstood. Prayer enters as one element into all forms of worship, however corrupted. Government ought to be the shadow of God's power on earth: and the right of petition is the high privilege of a free state. Petition is the voice of all nature. In arguing from analogy, we are forced to compare small things with great: but nothing is small or great in the eye of God, and His Providence rules over all. But it has been said by the infidel, God knows what is for our good, and His Pro-

vidence will secure it without our asking for it; and He knows what is for our evil, and will not grant it because in ignorance we ask for it. This common-place objection to the principle of all prayer will not, for an instant, bear the test of analogy, and it utterly misrepresents our position in the world. In subordination to the laws of nature, which we allow to be wise and good, there are, as a matter of fact, grievous ills in society; and we have the power by our own voluntary acts of greatly modifying these ills, both morally and physically: and herein consist some of our very highest social duties. If in the material world which is governed by material laws, we can by our own voluntary works amend our condition—if we can build cities, cultivate arts, and perform a thousand social and beneficial acts in subordination to God's physical laws; surely, on a most just analogy we may hope also, in subordination to the immutable moral laws of God, by our own spiritual acts in like manner to amend our spiritual condition. A good gift conferred on man as a natural reward of his own voluntary acts, may be, and often is both morally and socially, a far better thing than a good gift conferred on him naturally and without the intervention of his own voluntary acts. Prayer, I repeat, is the voice of nature, and is in unison with the commands of religion; and the common objections against the spiritual act of prayer will not bear the test of reason founded on analogy. Other objections to prayer resolve themselves into physical fatalism, and an entire rejection of Providential government. Analogy gives us a good reply to them all.

(17) Religion teaches many things that are, at first sight, hard to be understood. She tells us of God's absolute foreknowledge—of His unerring decrees—of predestination—election—and of particular nations set apart as His favourite people. Whatever may be the meaning of such declarations as these (and I may observe that they seem always to be made as the Providential rewards and conditions of faith and obedience), we find them in the Word of God. If in the pride of reason we dare to cavil at them, Religion turns round upon us and asks us—whether the potter hath not power over the clay, and whether he may not make one vessel to honour, and another to dishonour? At the same time she tells us not to rebel against the providential decrees of God—to bow before His throne, and not to tax His justice. But are these doctrines contrary to the analogies supplied by natural religion? The religion of Nature tells us that they are not. The physical laws of God are of no partial operation; but under like physical conditions there is not any thing approaching to apparent equality in the distribution of His social and moral benefits. One society is living in barbarism and gross darkness—another, in comparative happiness, and in the light of religious knowledge and civil freedom. There is, then, no apparent equality in the distribution of the greatest moral and social benefits; and in one point of view all these things may seem to be wrapped up in the consequences of stern

unbending laws ordained by the God of Nature. From this high point of view they seem to be contemplated in those passages of Scripture to which I have alluded: and we all allow that in the eye of God the voluntary acts of men are but as second causes whereby He works out the purposes of His Providence. But it is certain that man is not permitted to contemplate his own actions and their consequences from the same high point of view; and hence may arise some great speculative difficulties which we can never entirely solve. We are, however, bound on the highest reason, so to interpret the word of God as not to bring one of His attributes into conflict with another.

Butler pretends not to solve the difficult question of moral necessity; still less does he dare, like an ideal Pantheist, to put himself in the place of God, and pretend to evolve all consequences, physical and moral, out of his own conceptions. He takes, on the other hand, the position of a humble inductive seeker after truth. He appeals to the actual course of Nature, and tells us that practically we are so far free as to be responsible for our deeds—that we experience within ourselves a liberty of moral choice, and that we have (as we know by every day's experience) the power of performing actions which, under the God of Nature, contribute to our social happiness or misery—that practically there is no difficulty in the question before us.

St. Paul, speaking with authority, tells us the same truth in many exhortations, and in almost every form of written language. If we are weak, we are told natural and revealed religion. We know there are other worlds, but what moral connexion we may have with them is utterly concealed from us. In Nature many things are concealed from us, and "we know but in part;" for our knowledge is limited by the narrow conditions of our being. Enough has been already said on this subject. By what analogy have we, then, any right to expect that in the scheme of Providence bearing on our moral condition in futurity, our light should be altogether clear, and that nothing should be left untold? But, thanks to the God of all worlds! our moral light is clear so far as He has revealed Himself.—Our knowledge is co-ordinate with our condition—our duties are plainly set before us,—and our hopes are built upon the "rock of ages."

Such is an outline of the great argument from analogy. Different illustrations of it will offer themselves to different persons, in conformity with their habits of thought: for the argument, like that which is drawn from the consideration of final causes, may be carried through all parts of Nature, and the pursuit of it, to say the very least, is a salutary moral exercise.

Arguments drawn from analogy, like those of which I have given a feeble outline, can produce no impression on such men as Hume and Strauss. But what do men such as these give us in return? Hume's philosophy is sceptical, and leads us to doubt of every thing, both here and hereafter. Strauss' philosophy is pantheistical, and discards the best evidence of inductive truth. It turns all our religion into a phantasm, and all its historical documents into a fable. Yet these documents were not circulated as a mythical invention. They were woven into the facts of true history; they were believed; they were acted on; they produced the greatest revolution in the history of the human race; they are believed still as true historical realities; and that belief has directly or indirectly affected the fortunes of all civilized men, and mingled itself with the noblest and the firmest development of their social institutions. We cannot surrender our belief in the sanctifying and exalting realities of religion, to a baseless, atheistical, and unpractical philosophy.

What has been stated in this Preface on the nature of Christian Evidence is not addressed to one who has studied his religion, and heartily taken it as his rule of life; but rather to one who is still on the threshold of the subject, and is stumbling among apparent difficulties. To such a one the argument drawn from analogy may be of the deepest value. So much I may say from the remembrance of my own difficulties in early life. Thousands, I am certain, have gained both in their moral and intellectual health by the study of Butler; and, so far as I have heard, there never was but one person who was morally injured by it. He was a man of learning and great historical knowledge, of a severe logical mind, and apparently of a stern natural temper. In early life he became a Deist. But little satisfied in this belief, he studied Butler's *Analogy;* and finding, during this study, the same or analogous difficulties in natural and revealed Religion, he rejected them both, and became, through the rest of his life, an unflinching Atheist. There are strange moral anomalies in human nature, and this is one of them. We have nothing to fear from this example.

As a general conclusion from the previous details of this Preface, I venture to affirm, that Religion has much to hope and nothing to fear from the progress of physical discovery, so long as it is carried on in that humble inductive spirit which shines through the works of the great men who have adorned the history of our University. But woe to the University of Cambridge if she turn aside from this spirit!—if she try to put down the God of nature, and set up for worship His creature man—if she give not to faith what belongs to faith, while she gives to reason what belongs to reason—if she be not ready, at all cost, to fight the battles both of faith and reason—believing that the God of Nature is the God of Revelation, one and unchangeable—believing that He is the God of all truth—and on the strength of that faith believing that to extend the domain of truth (in whatsoever form she may present herself) is to extend the knowledge of our Maker, and to do His will. This is no bigoted or narrow creed; it is the faith of every Christian philosopher.

§ 2. *Recent Changes in the University Course—Modern Science of Cambridge—Philosophical Society—Modern external improvements—Moral and social character of the Students, &c.*

The reader who has gone through the preceding pages may perhaps have complained, that the criticism on *The Vestiges of Creation* is too long, and out of proportion to the other discussions of the Preface. But that Work has had a very wide circulation; partly from the good language and positive form in which it is written, and perhaps still more from the novelty of its conclusions. For the Author (apparently without seeing the end of his philosophy) has been the first to put material Pantheism, decked in a good English dress, before the readers in this country. He has also written *A Sequel to the Vestiges*, to which no formal reply has yet been given. I was therefore constrained to notice this Author's two Works in some detail; and through them I have been led to my main object: viz. to expose to our Undergraduates the mischief of modern pantheistic doctrines when applied to physical, moral, and religious questions. With all these subjects I have now done*.

---

* Several months after this section was written, and when a considerable part of the Preface was printed, I received a copy of *The Foot-Prints of the Creator*, by Hugh Miller, (London, 1849). This work (which I earnestly recommend to the reader), is written with the Author's well-known graphic power, and contains many original and admirable details respecting the Fishes of the Old red sandstone, which will compel me to abridge, and almost suppress, one of the Notes (No. III.) in the Supplement to the Appendix.—Mr. Hugh Miller also attacks, with very great skill, many of the false positions taken up by the Author of *The Vestiges*. Had these *Foot-Prints* appeared sooner, I might have abridged the early sections of this Preface, and made them less open to the criticism alluded to in the opening words of this section.—See the *Supplement to the Appendix*, No. IX.

The present section of the Preface is no longer addressed to the Undergraduates and other resident Members of the University; but to persons who, although absent from us, take some interest in our system of teaching, and are anxious for our honour and well-being.

The remarks, in the following Discourse, on the moral and metaphysical studies of the University, have, I rejoice to say, a far less exact application to our system now than they had in the year 1832. The two great Works of the Master of Trinity College, on the History and the Philosophy of the Inductive Sciences, are now a part of our stock-literature; and these Works, together with his Lectures on the Moral Sciences, are telling year by year on Cambridge studies. On this subject I can speak with some confidence; for I have, during the last four years, taken a part in the Fellowship-Examinations of the College in which I live; and I have found, not without sentiments of surprise and admiration, that some of our younger sons have, in addition to our Classical and Mathematical course, shewn a very exact knowledge of the Aristotelian logic and other kindred works, of the best British metaphysical authors of the last century, and of the bold and novel speculations of the modern German School.

But, during the past year a great addition has been made to our regular Academic course, which will, in its season, produce much good fruit, if it be followed out in the spirit in which it was begun. And that it will be followed out, we cannot permit ourselves to doubt: for we have at our head a Chancellor who is young and full of hope, and has the prospect under Providence of a long life before him. His position, by the side of the Throne, must in itself give him a great moral influence; and he has a better and far higher influence from his private virtues, and from the large and liberal views he has taken of the great objects of science, and of the social duties of scientific men. I can therefore speak of the future only in the words of good hope. Some men fear that our old and severe intellectual discipline may suffer by these contemplated changes. Had I partaken of these fears, and believed that our stern mathematical studies, which ever since Newton lived amongst us have been the glory of Cambridge, would descend from their high place, as a natural consequence of the Graces last year passed by the Senate, I should then have been almost willing to cross England barefoot to record my vote against them. But we have nothing to fear from this quarter. Our highest prizes will still be carried off by those who reap their honours in the Mathematical and Classical fields.

There is a social character in true knowledge. Art and imagination, science and learning, freedom and wise polity, all flourish best together. One material science is not in conflict with another; but all of them flourish best when all of them are called into their fullest activity and most vital energy, and are all moving on side by side. It is not excessive activity, but an unhealthy deathlike stagnation, that is the bane of an Academic body like our own. Chemistry, Mineralogy, Geology, Botany, Anatomy and Physiology, and other Natural Sciences (now an acknowledged part of the Cambridge course, and the subjects of Academic honour), may all flourish well together, and assist rather than retard the work of the mathematician. Some of them may indeed suggest, and already have suggested, new problems to the mathematician which he alone can solve. And he may be encouraged and cheered in his severe and sometimes solitary toils by the active sympathy of those around him; for they know that he alone comprehends a language more powerful and logical than they are permitted to use—that he can express from Nature truths which to themselves are inaccessible—and that he has been taught to wield implements of all others the most potent in the higher provinces of physical discovery.

Again, our Academic training is for the many, and not for the few who reach a very high grade of knowledge in exact science. These men indeed may require support and encouragement such as the University can give them; but they are soon above all common rules of teaching, and stand not in any need of them. But we know well that there are many among our students who, without any power even of comprehending the higher abstractions of exact science, may be encouraged to seek for, and may gain distinction in a "Moral Tripos," such as is now instituted, which comprehends Moral Philosophy, Political Economy, General Jurisprudence, the Laws of Engand, and Modern History. Surely a field like this is wide enough!

I wish however to confine my present remarks to the physical sciences: and it is by no means true, that a man who is by nature little fitted to gain distinction from the study of Mathematics, cannot therefore profit by a less severe attention to other studies that are based on observation and experiment, or exercise the powers of philosophical arrangement. There is no such limitation in the faculties of man; and we are bound to produce good intellectual food for all our sons; and if they make good progress, even in what we regard our more humble and less exact studies, to give them a commensurate reward and a public honour. Such rewards we hope to give them in our new "Tripos of Honour" for their good progress in the Natural Sciences. These are the principles on which we have acted, and we live in good hopes for the future.

But whatever changes we may make, from time to time, in our Academic studies, we must not expect too much from them. Indolence and caprice, folly and bad passion, we shall still have to fight against. Human nature will remain the same with all its attendant infirmities. We cannot teach our sons to be profound in everything. All we can do is to give them a good wide field for study, and to encourage them to active labour, now in their intellectual seed-time, so that they may become well informed in those subjects of wholesome learning that are within their capacity. If we try for more than this, we shall fail utterly; we shall only be teaching our sons to shew the glittering surface of knowledge without its true solidity; and then it may become little better than gold-leaf that is only fit to cover a toy.

Above all, we are to press on the belief of our sons that all parts of Nature—religious, moral, social, and material—are one great connected system, of which no one part can flourish effectually without the rest. We must teach them the sanctity and severity of Truth; that if she conceal herself from us, it is only that we may seek her out; and that we are not permitted to approach her, but by the lessons of treasured knowledge, by the light of experience, and by the honest use of all those helps the God of Nature has put within our hands. If we neglect these lessons, which have long formed, and under God's blessing ever will form, a part of the teaching of this University, we then leave our cable and our compass, and soon may drift away in "the ship of fools" into the wide ocean of hypothesis; and there among the fantastic visions of a false philosophy we may make a wreck of all our principles of common sense and solid reason, and of all our sober hopes of future good.

Our best hopes for the future good of Cambridge depend on its past and present history. Our new Academic regulations are not experiments to restore a suspended animation, but proofs of active vitality—new voluntary labours, taken up by those who laboured hard before. We are not so much striving to change our system, as to improve our mechanism, and to apply stronger motives to those who come to our seats of learning. My own knowledge of Cambridge reaches back over a period of forty-five years. During the whole of that period annual lectures have been given by our

Professors on most of the subjects of natural science above enumerated, and now we have annual courses of lectures on every one of them; and to this list I must add two old and effective courses of lectures—one course on the philosophical principles of machinery—another on experimental illustrations of the higher branches of physics. We have now also public lectures on the Hebrew, Arabic, and Greek languages. When I was a young man the Professors of these tongues were all silent. The same might be said of two out of our three Professors of Divinity. They had important duties to perform, to which they were then and to which they are still, bound; but, in addition to such duties, they all now read public lectures to good and earnest Classes of young men. I need not here repeat what has been said of the moral and metaphysical lectures of the Master of Trinity College, which form an entirely new part of our Academic Course. Facts such as these are not given for the information of the resident members of the University. They stand not in need of information; but this Preface may perhaps meet the eyes of some who have little knowledge of our cycle of study.

If all this be true, some one may perhaps ask us, Why was there any need for new legislation? We reply that the Spirit of our legislation is not new: we do but strengthen our old laws by giving new and honourable motives for their better observance. One who is merely seeking for a Degree in Arts without aiming for a place in our list of Honours, will hereafter be called upon for a certificate, not only that he has attended to his College duties, and satisfied those to whom he is more immediately responsible while he is an Undergraduate; but also that he has attended one or more courses of public Professorial Lectures in the natural and moral sciences. Surely this is not too much for us to ask; and it is notorious that, during past years, multitudes of young men have obtained their Degrees in Arts (after going through the necessary routine of private and College tuition) without ever having attended the lectures of a single University Professor. I have known many good men who in after life have lamented this great oversight of their undergraduate years*.

But we have done much more than this. Our Undergraduates are now not merely invited to a voluntary attendance on our cycle of material and moral sciences, but are encouraged and urged on to such studies by the hopes of academical distinction, and the promises of public reward. Surely this is a movement in the right direction! It is an improvement in our system—an academical reform—but not an organic change and a revolution. We have the same mechanism we had before; but we have braced it up anew, and it may we trust hereafter work well under a higher pressure.

---

* The Undergraduates are compelled to attend the College Lectures, given daily by the Tutors and their Assistants; but these persons are not officers of the University. The Professors are Officers of the University, and their Lectures are addressed to our whole collective body: but before the passing of the Graces, alluded to above, no Undergraduate (with the exception of a small number of Law and Medical Students) were directly compelled to attend any Professor's Course. Indirectly, however, some of them were compelled to attend a theological course: for most of our Bishops required, from the Candidates for Holy Orders, a certificate of such attendance from one of our Divinity Professors. Our Professor of Physic (on the authority of a Grace) required from the Medical Students, before they could be admitted to a Medical Degree, a Certificate of their having attended the Lectures given by the Professors of Anatomy, Chemistry, and Botany. I take no notice here of the very extensive system of private Tuition now going on in Cambridge; because it forms, theoretically, no part of our Academic Course, and cannot easily be brought *within* the legislation of the Senate.

Since the general peace of Europe, our numbers are more than double what they were before; and, speaking of our mathematical studies, I may venture to affirm, without boasting, that since that time a good spirit has been alive amongst us. Thirty years are gone since the first formation of the *Cambridge Philosophical Society;* and in the *Transactions* of that body (which are a good record of the severe labours of Cambridge men) there is hardly a subject which has engaged the attention of the great Mathematicians of Europe that is not discussed in original papers of very great value. All the powers of high analysis have, in our *Transactions,* been brought to bear on the most severe and knotty questions of physics:—such, for example, as the theory of light and electricity—the theory of undulations in connexion with the great practical question of the movement of the tidal-waves—the planetary perturbations—the figure and internal structure of the earth—the theory of sound—and many other practical applications of profound mechanical philosophy. Nor has analysis, as an implement of pure reason, and without any reference to its immediate use or application, been overlooked by our younger members. It continues to be pushed beyond its former limits, and it carries its reward in the delights of discovery, and the enjoyment flowing from the pure unmixed love of truth; and sometimes, perhaps, in the hope of its future application to the business of life and the practical good of our fellow-men.—We need only mention the names of Cumming, Christie, Clark, Herschel, Babbage, Whewell, Henslow, Jenyns, Willis, Power, Lubbock, Airy, Challis, Miller, Hopkins, De Morgan, Murphy, Earnshaw, Kelland, O'Brien, Ellis, Cayley, Green, Stokes, and many others—all of whom were trained amongst us, have partaken of our honours, and been contributors to our *Transactions*—and we do enough to justify what I have said of the philosophical spirit that has animated our University for the last thirty years.*

Two great discoveries in physical astronomy have, within that period, been made by Cambridge men: and it deserves remark, that these two are the only great discoveries in physical astronomy made by Englishmen since the days of Newton. I here, of course, allude to Professor Airy's discovery of the long period of perturbation in the Earth's orbit by the action of the planet Venus; and to Mr Adams's theoretical discovery of a new planet external to Uranus. Both these discoveries were made after enormous labour, long continued, and directed by consummate mathematical skill. The former gave a new element towards the perfection of those Solar Tables that are in the hands of every scientific navigator. The latter was, perhaps, the most striking result ever brought out by the application of analysis, and shewed us the perfection and the certainty of a good mathematical deduction from an acknowledged principle in physics.

---

* See the Supplement to the Appendix, No. X.

In the early part of the last century Queen Anne visited this University; and, after dining in the Hall of Trinity College, conferred, at a public academic levee, the honour of Knighthood upon Newton—a man (I need not tell the reader) whose name stamps a glory upon Cambridge, and who, by his labours, changed the whole face and form of natural science. In 1847; our present Sovereign, whose presence amongst us was greeted with our loudest and most heartfelt expressions of loyalty and affection, came hither to grace and honour the Installation-visit of Prince Albert; and after a similar festivity, and at a similar academic levee, the honour of Knighthood was offered to Mr Adams for the part he had taken in the most striking astronomical discovery that had been made by any Englishman since the days of Newton. On the same occasion, Sir John Herschel presented to our royal and youthful Chancellor a noble intellectual offering—the first bound copy of *Astronomical Observations made at the Cape of Good Hope* during five successive years, and *The Completion of a Telescopic Survey of the whole surface of the visible heavens, commenced in* 1825. This work abounds in the proofs of mathematic skill and high inventive power, is sometimes animated by a spirit of bold but chastened speculation, and contains, out of all comparison. the most astonishing record of new Astronomical phenomena that is found in the English tongue. None of these facts are unknown to Cambridge men; but they may not be fully known to every one who may read this Preface: and they prove what I am endeavouring to impress upon the reader—that the genius of Newton's philosophy has not departed from that corporate body in which he spent the best years of his life, and wherein he made all his immortal discoveries.

It is by no means unusual for men who have no knowledge of mathematics, and little knowledge of the branches of natural philosophy beyond their names, to undervalue the labours of the Mathematician, and to speak of him as a kind of drudge who deals only with numbers, and tabulates the results obtained by the operations of a higher and more inventive intellect. In one sense this opinion may be true; but in another it is not merely narrow and inadequate, but it is positively false. It is true, that on the outskirts of the great circle of human science there is a dark region no one can enter without the light of experiment. The performance of this task is like a voyage to a new and unexplored country; but when a new land is discovered our task is not done. The discovered country must be colonized and cultivated and brought under the administration of wise and good laws, or it will continue barbarous and unproductive. A mathematician is well employed in tabulating results, and bringing them into symmetry; but his labour ends not here. Every new result in experimental science is based on some acknowledged principle, and can only find its place as a scientific truth by being brought to bear on some scientific hypothesis: and it often happens that a mathematician is, of all men, best able to follow out the consequences of an hypothesis, and thereby to test its truth. He both urges on and directs the labours of the experimentalist. He can confirm the experimentalist where he is right, and can check him where he is wrong, and thereby direct him either to new and better experiments, or, it may be, to a better grounded hypothesis that may end in a sound theory. This was the logic that guided Newton's long life of discovery; and while this spirit rules amongst us, we have nothing to fear from those wild visions and transcendental dreams that have sometimes been the clog and disgrace of modern science. The stern logic of mathematics gives us then both an excellent physical and moral training; and its good effects are not merely seen among men who spend their lives in the abstruse investigations of exact material science, but sometimes also among men who go out into the world and perform their appointed tasks in the Senate, at the Bar, and in all the busy and bustling walks of life. I need not quote examples: the fact is notorious, and, I believe, undisputed.

It is not, I repeat, in tabulating the results, or in testing the general conclusions of empirical science, that the value of mathematical studies is best exemplified. Every general principle in physics involves a multitude of particular consequences; and it often happens that the most recondite and valuable consequences of a general principle can, from their very nature, be accessible to no man living but a profound mathematician.

In such a condition of knowledge, experimental and inductive skill may for a time lose their first pre-eminence; and it is chiefly from deductive science, aided by all the resources of mathematical invention, that we can hope for great discoveries.

La Place did not, I believe, establish any new mechanical principles, and he never made so much as one good astronomical observation: but he spent his life in drawing new and great discoveries out of old established principles. The great astronomical cycles which he discovered are not objects of sense, but of pure reason, and require many thousand years for their accomplishment: but they are as certain, and are as fully established, as any facts of direct observation or experiment. They are facts of positive demonstration, deduced from the law of gravitation; but the law itself never could have been reached or comprehended without observation and experiment. We confound not the discoveries of pure reason with the discoveries brought out by experiment; but we affirm that in all physical reasoning the two are bound together, and that the former cannot have any existence without the latter. Deductive discoveries have however always held a very high grade of honour; and La Place was, by common consent, allowed the highest place among the scientific men of his great country. Deductive discoveries are not less true, because they are not experimental: and they are often more noble (and, it may be, more useful) than discoveries that are experimental; for they are the crowning fruits of a severe logic, and of the very highest and most laborious efforts of pure reason.

It would ill become me to dwell long on the practical application of mathematics, and I have little knowledge to help me in discussing such a question: but while pleading for the honour of Cambridge, and speaking with cheerful hopes of her future prospects, I may just allude to one or two subjects that must, we should think, come home to the heart of every Englishman, with whatever party he may range himself. In the process of condensation the last strokes of the piston give us the true test of the perfection of our mechanism. And so it is in nearly all progressive sciences. The crowning acts, whereby they approach perfection, can only be done by the greatest power of mechanism, and the utmost refinements of intellectual skill. Our sailors may man our ships and fight our battles, do the great work of commerce, and bring to our homes the precious fruits of climates more genial than our own; but they cannot cross the distant seas in safety without those Astronomical Tables which, year by year, have been approaching more nearly to perfection. To the Mathematician they owe these tables, the perfection of which depends upon the highest refinements of analysis combined with the utmost mechanical perfection in the conduct of our Observatories. But mere recorded observations, however accurate, are worthless till they are *reduced* and cleared of errors derived from refraction, parallax, aberration, precession, and nutation. This reduction is an operation of vast labour in an Observatory; but it was undertaken at the Cambridge Observatory first by Professor Airy, and has since been continued by Professor Challis, so that all the fourteen volumes of Cambridge Observations give us *reduced* results which are available to the public. This task had not been done at Greenwich. The greatest magazine of good observations that existed in the world, was stored up at Greenwich, but was *unreduced;* and the Observations were like an ore that contains a precious metal, but is utterly unfit for public currency. But our Cambridge Professor was removed to the great national Observatory; and, backed by the liberal power of Government and aided by a strong band of calculators, he there undertook the task of *reduction* (the greatest task of its kind in the history of Astronomy), cleared off the arrears of a century, and has now made the Greenwich Observations a part of the circulating stock of the whole world of science. Already the world is reaping the fruit of this almost superhuman labour; for one of the few unexplained tabular errors of the Moon, the opprobrium of physical Astronomy, has been brought under the dominion of law by Professor Hansen, who based his analysis on the suggestions supplied by the *reduced* Greenwich tables.

Again, good tide-tables are of inestimable value to the navigator. The tides are, in the first instance, mere facts of observation made out by good experiments. But tide-tables are results of a very different order. They are based indeed upon experiment, but their construction involves a knowledge of the lunar inequalities and periods, is a true and very abstruse part of physical Astronomy, and cannot be perfected without the utmost refinements of mathematical analysis. Much has been done, within the last twenty years, in improving the theory of the tides, and bringing the tables (so far as they relate to the British Isles) more nearly towards perfection. And who are the men who have laboured most effectually in this field? Whewell, Lubbock, and Airy—all of them men whom Cambridge honours, and who perhaps would not have been known to the scientific world but for their Cambridge training.

If the Mathematician has rendered invaluable services to his country in the construction of nautical tables, his services are also wanted in the construction of our ships. Of all men living the Captain of a ship of war may know best how to fight the battles of his country, to guide his vessel through the seas, and to govern its crew: but this knowledge teaches him not the principles of mechanical construction; and still less does it give him even a glimmering knowledge of the solid forms whereby a vessel may pass with the least resistance through the water, or of many other true mechanical results, that he cannot so much as touch without the help of severe mathematical analysis.

A Mathematician may easily blunder in the construction of a ship, by overlooking some practical question that did not enter into the elements of his first calculations. But as his blunders are made on principle, so do they necessarily lead him to a revision of the conditions under which his complicated problem is to be solved; and he learns at length to strike a kind of balance among consequences that at first sight may appear in conflict among themselves; but, in the end, are reducible to a true mechanical subordination. A practical man will inevitably blunder in his construction, if, guided only by experiment, he overlook the truths of theory; and his blunders being made without any steady principle, give him none of the sound elements of a better structure. The good of the State requires that in the construction of our ships experiment and theory should each have their part, and go hand in hand: but it is notorious that in England this union has never been thoroughly effected — that men have sometimes undertaken to build the bulwarks of the State without a knowledge even of the first principles of hydrostatics, and of nautical construction—and oftentimes without any good scientific grasp of those refinements of analysis which should both direct and control the experimentalist. And what has been the consequence? Our national ship-builders have often blundered upon what was excellent, but have not been excellent on principle: and it is, I believe, notorious, that during the wars of the past and present century some of our very best forms of naval construction were copied from the ships of our enemies. The reason for all this was plain enough. In France, the art of naval construction was taught by men of profound science combined with men of practical skill. In England. we had men of consummate skill derived from great experience; but science was almost overlooked; and we have endured much national loss, and some dishonour, as the consequence of this blindness.

When iron Steamers were first constructed, the magnetic needle became almost useless in consequence of the attraction of the vessel: but by a happy combination of experiment and mathematical calculation, this great difficulty was removed, and Professor Airy gave our Captains a set of rules whereby they were enabled to conduct an iron vessel over the Atlantic with as much security as one that is built of oak. There is, indeed, no end to the practical application of mathematical analysis to the business of life. This truth is obvious, and is perhaps universally admitted. But I must dwell no longer on this subject, and the examples I have selected are such as speak, one should think, to the common sense and feelings of every inhabitant of this country. Men may, perhaps, be found who regard the theoretical discovery of a new Planet as a kind of astronomical luxury that is of small social value; but no one will be so hardy as to deny the immeasurable importance of good nautical tables, and of good principles of construction in the great dock-yards of England.

The highest prizes of society will, however, be given to the bustling combatants in the busy and practical walks of life. The solitary labours of the Mathematician have little interest with the busy public. They understand not one syllable of his language—they know nothing of his toils—they can have no true sympathy with his pursuits—and they have no true conception of the great accessions he can bring to the common stock of knowledge. From open competition in the State he has little to hope for. But he has much to hope for in the enlightened patronage of a wise government, and in Academic institutions like those of Cambridge and Dublin. Evil would be the day for the Science of the British Isles were the high honours given to mathematical learning by these two Universities to lose their estimation through any change of system. The great Mathematicians of Dublin will be true to their best interests; and Cambridge, I doubt not, through every moral and intellectual change, will continue true to the interests of high mathematical science. Its practical bearing on the business of life is universally admitted; and on this account we honour it: but we have higher motives for upholding it and honouring it in our Academic course—as the guide to the highest forms of material truth—as an instrument to draw out the consequences of accumulated discoveries—as a check to wild hypotheses—and as a part of severe logic, of moral training, and of intellectual discipline. I repeat, therefore, that the hopes of the University of Cambridge rest on her past and present history—that in our new acts of Academic legislation we mean to strengthen our old system, and not to pull it down—and that we mean not to abate one jot of the high honours we hope hereafter to award to those students who make good progress in mathematical learning. Evil would be the day to the University of Cambridge were she to decorate with her best honours men who continue but accomplished school-boys, while she forgot those who are toiling in more manly labours, and bringing new materials to the public stock of knowledge—who are not spending their whole time in the embellishment and illustration of the past, but in looking to the future, and assisting in the intellectual and social progress of mankind.

External Improvements in Cambridge.

The whole external aspect of the University is greatly changed within the period of my residence. Nothing about us seems to shew neglect or decay: everything seems to point towards improvement and progress. The foundation-stone of Downing College was laid in 1807. Noble additions have been made to several of our Colleges; and some of these new works have been carried out at a great cost, and a great personal sacrifice on the part of the resident Fellows. In the noble spirit of private sacrifice to public and future good St. John's College stands preeminent.—We have now a noble Observatory, built out of the accumulations of the corporate funds of the University, aided by the liberal subscriptions of its friends and members. The Observatory is stocked with first-rate instruments, and for nearly twenty years has been in full activity. The fourteen quarto volumes of *reduced Observations* well attest this truth.—One side of a contemplated new quadrangle has been added to the Public Library. The upper floor of this building is of beautiful architecture, and is capable, it has been said, of holding 100,000 volumes. The contents of the Library are threefold what they were at the beginning of this century, and it is administered under regulations of great liberality; for it is not merely open for daily consultation, but thousands of its volumes are in constant circulation among the members of the University: and the same liberal administration is shewn also in the several College Libraries*.—An ample and convenient site for a new Botanic Garden has been purchased from our corporate funds, and its cultivation is already in progress. Our old Garden contained a very valuable Botanical Collection, well known through a scientific catalogue; but it was inadequate to our present wants, and it was greatly damaged by the new buildings of Cambridge, which now press upon it, and almost surround it.—In the early part of this century the Anatomical Collection at Cambridge was the property of the Professor, and we had no anatomical room deserving the name of a Museum. We have now an excellent Anatomical Museum that is open to the public. It contains a beautiful and most instructive collection, illustrative both of human and comparative anatomy. A part of these treasures were purchased out of our corporate funds, but another very important part of them we owe to the munificence and the long-continued personal labours of Dr. Clark.—On the first floor of the new building of the Public Library are two contiguous Museums—the one of Mineralogy, the other of Geology. The former contains the mineralogical collection of the late Dr. E. D. Clarke, which was purchased by the University: it contains also the noble collection of the late Sir Abraham Hume, which the University owes to the munificence of Viscount Alford. These collections are well arranged, are illustrated by a course of annual lectures by Professor Miller, and are accessible to the public.—The Geological Museum contains specimens collected during the last thirty years, only to be counted by tens of thousands, which are now arranged stratigraphically by Mr. M'Coy, and are constantly open to the public. In splendour and extent it is, of course, greatly inferior to some national collections; but for practical use in consultation, and for the purposes of academic study, it is not, I believe, inferior to any public collection in Europe. It contains also the original collection of Dr. Woodward, which has now a great historical interest, and continues in its old arrangement in conformity with the printed Catalogue. It contains also a very good collection of recent Shells, presented to the University by H. J. Brooke, Esq., of London, and of Corals, presented by Mr. Garnons, Fellow of Sidney College.—Within the same period has risen a magnificent Museum of Art, which we owe to a bequest of Viscount Fitzwilliam. Some may think this a work of splendour and luxury—and so it is—but we honour the memory of the noble Founder of the Museum, and rejoice in having now within our establishment the power of leading some of our youthful Members to the study of what is beautiful in art, as well as what is severe in science. Facts such as are stated in this long paragraph speak best for themselves, and stand in need of no comment to make their meaning clear.

---

* Five or six thousand volumes are in constant circulation from the University Library; and any volume may be returned after it has been read, and another may then be taken out in its place: so that the actual amount of books circulated during any Academic Term from this Library is enormous. The College Libraries are available for the resident Students of the several Colleges. About a thousand volumes are in circulation during Term from the Library of Trinity College: but these volumes are continually returned, and others taken out in their place, at the pleasure of the Students. All books are returned to the Libraries once a quarter in order that their condition may be examined.

Much, however, remains to be done before our external mechanism can, on the humblest view, be regarded as complete. The Cambridge Philosophical Society possesses a beautiful collection of British Ornithology, obtained by purchase, and many other precious specimens of Natural History presented by its Members. The whole ornithological collection of Swainson was obtained by a liberal subscription of our resident Members, and presented to the University; and it has been since increased by a valuable series of specimens, presented by Captain Blackwood.* But we have no Zoological Museum—a fact which may well excite astonishment, when we remember that Ray (the greatest of English naturalists) was a Fellow of Trinity College, and a contemporary of Newton. This is a grievous want.—Our public lecture-rooms are defective in number and unworthy of the University. Our new scheme of Undergraduate-study will make these defects more grievous than they were before, and induce us, I trust, before long, to complete a second side of the new quadrangle of the Public Library. The first floor of such a building would give us all the accommodation we stand in need of.—We give degrees in Music, but we have no great Hall of Music. Such a building might be called a luxury; but it would add to the splendour of the University, which cannot be complete without it. For want of such a building the last public Academic exercise in music was performed in a private College Chapel.—Above all, we want a public Hall well stocked with instruments for physical and chemical experiments, and open, on liberal terms, to every Member of the University. Our young Members should not merely see experiments made by others, but should have an opportunity of making experiments for themselves, if we hope, by the help of our teaching, to ripen the best fruits of scientific knowledge. Newton felt the want of such an establishment when he was a resident member of the University, and many good men have felt it since his time.

---

* This gentleman, after returning from a long and perilous voyage of discovery, put on the Academic dress, and resided a year amongst us as a Member of Jesus College.

But, it may be said, that our corporate funds are all gone, and that our income is hardly sufficient to meet the annual demands which are made upon it. This is unfortunately true; and I know that no great work can be done by the University without a personal sacrifice on the part of its Members. What I contend for is, that from our past and present history we draw our hopes for the future good of Cambridge; and if, during the next thirty years, she be guided by the same spirit that has animated her during the thirty years that are gone, then will not one of her public buildings be left unfinished, nor any thing left short that could minister to her honour; but she will go on, faithfully and wisely, in perfecting the great and good task which Providence has set before her, and the country looks for at her hands.

Our best hopes for the future good of Cambridge are not, however, grounded merely on the improvement of our external mechanism, or on any scheme of instruction however wisely planned. They rest rather upon the moral and intellectual character of our sons.—In the early years of this century, convivial excesses, though gradually disappearing in good English society, were too often its bane and disgrace. The University of Cambridge, like all other great corporate bodies, felt the ill effects of these sensual and degrading evils. How could it be otherwise? Persons just arrived at man's estate, and in all the exuberance of youthful feeling, were sure to be led astray when temptation was enforced by the habits of society, and sensuality was sanctioned by the examples of men who had reached the highest grade of public honour, and were the idols of popular worship. I have lived long enough to be called a *laudator temporis acti:* but from this part, at least, of an old man's weakness I am free—I cannot praise the past Academic generation at the expense of the present. The manners of English Society have changed for the better, and Cambridge has felt the change. Intemperance and convivial brawlings have ceased to disgrace our Colleges. In every condition of society there will be exceptions to the general rule of sobriety and good order: and were they flagrant and disgraceful, the University would put them down by the strong arm of authority. But there is a still stronger arm in the power of public opinion; for intemperance is now regarded as disgraceful, and ill befitting the manners of any one who wishes to pass under the name of a Christian and a gentleman. On this subject, the rules of discipline, the sense of public honour, and high principle, all combine to a common end; and thus united their power is irresistible.

Again, the religious habits and sentiments of Englishmen have greatly improved within the last fifty years. Those who have watched these changes, must have seen, along with them, some of those evils that are the inevitable concomitants of every great social change, though it be from worse to better; and while human nature continues what it is, we shall never pass through any period of great religious movement in the State without some outbreaks of folly, mysticism, and fanaticism. Some will be worshippers of forms and symbols to the verge of rank idolatry; others will be contemners of all form and order—some will mistake the outer decorations of the Church for its sanctuary; others will deny our need of any sanctuary—some will contend for despotic authority in the priesthood; others will deny all authority to the ministers of Christ—some will rationalize all mysteries, and cut down the Word of God to the lowest standard of human reason, so that it may teach nothing but what comes within the limits of our experience; others will exalt mysteries at the expense and degradation of reason, and make our faith little better than a blind submission to authority against which reason may not raise its voice.

English society (spite of some evils, offensive at once to common sense and Christian charity) has gained in true religious strength during the present century; and Cambridge has shared in the benefits of this moral progress. We now see more earnestness and decency and gravity in the religious conduct of our sons than were seen in the early years of this century. We want not the outward homage of a hypocrite—this would be no matter for rejoicing: but we do rejoice to see a great majority of our sons attending the most solemn acts of religion; and shewing that earnest gravity which becomes men who think in their hearts that religion is a solemn matter in which they have the deepest personal concern. In making this statement I know that I am only using the words of simple truth. The venerable Bishop of Calcutta spent some time amongst us during his last visit to England. He knew our constitution well; but he sought for information as to the present moral condition of the University, and the practical working of our system. He attended our Halls and Chapels, not as a spy, but as a friend and a fellow-worshipper. He knew what academic habits had been in his youthful days, and he saw what they were now: and he left us after expressing, again and again, and in far stronger words than I have used in the preceding sentences, his conviction of the great social and moral benefits of our present training.

It is often urged against us, that our discipline is lax, and that our academic liberty degenerates into licentiousness. We reply, that open licentiousness is put down with a strong arm, and that offences against good manners are visited by a stern punishment whensoever they come under the notice of our authorities. But we do allow our younger members a great freedom of action; and we think it right and good to confide to them this liberty. Students between the ages of nineteen and twenty-five are not to be treated like children. By a system of *espionage*, and by a more direct and personal restraint, we might prevent some acts of youthful folly, and some licentious wanderings from the right way. But such a system of discipline would be an insufferable evil, and ten times worse than the ills it was meant to cure, and would be utterly incompatible with the growth of that free, patriotic, truth-loving, and manly character, which is now, and we hope ever will be, the honourable distinction of a Cambridge Undergraduate.

As a matter of fact, our students (with very limited exceptions) leave us with the sentiments of chivalrous attachment towards us; and with feelings of lasting love and friendship towards their young rivals in the liberal Academic race. And herein is a great gain to the State: for at the old Universities men of rank and fortune, destined from their childhood for the higher duties of public life, and of every shade of political opinion, are engaged, side by side, in common studies and common social pleasures, and learn to live in mutual respect and goodwill, undisturbed and un-tainted by any element of party rancour. These feelings they carry with them into public life. Each man, on his own principles, takes his side in the conflicts of society and the battles of political party; but he begins these conflicts with the tolerant sentiments of a patriotic Englishman and a Christian gentleman. In the reports of Parliament we are sometimes startled by meeting with expressions that are vulgar, narrow-minded, and unpatriotic: but we seldom, if ever, can find them dropping from the lips of one who has gained honours at our old Universities, or partaken of the humanizing influences of our free and manly discipline.

The governing body of Cambridge is sometimes described, by those who know not the true and practical value of our system, as a conclave of bigoted ecclesiastics who have little knowledge of the progress of society, and little feeling for its present wants. It is true, that the greatest number of our Colleges are religious and ecclesiastical foundations: but the University, as a collective body, is a lay corporation. Within the last forty years many of our distinguished Tutors, both public and private, have been laymen; and at this moment nine out of the twenty-five public Professors of the University are laymen. But it follows not that our teaching is inexpedient and illiberal, because the ecclesiastical element enters so largely into our constitution. This question was discussed at great length and with much earnestness in the last conversation I had the happiness of holding in the chamber of the old philosopher La Place, a short time before his death. In conclusion he said, "I think your teaching good and liberal, and for the benefit of your country; and I think it one of the misfortunes of my life not to have seen Cambridge. When I was a young man I had not the means of travelling; then came the terrible war of the Revolution; and now I am too old to travel, and I must die without seeing the place where Newton lived and made his great discoveries." And he then added in an emphatic voice (repeating more than once the words to which I have alluded in a following Note (*infra*, p. 129,) "I think your teaching right, and were I in your place I should deprecate any great organic change; for I have lived long enough to know, what we did not at one time believe, that society cannot be upheld in happiness and honour without the sentiments of religion."

The University is governed by very ancient laws and customs called *Statuta Antiqua*, and by a formal code of Statutes, enacted in the 12th year of Queen Elizabeth, which has permanent authority, and cannot be changed by any power vested in the Senate—our corporate legislative body. It is not likely, it may be said, that a Code of Academic Laws, granted in the 12th of Elizabeth, should be well suited to the times in which we live. This is in part true; and some of its enactments have become obsolete, and are now forgotten. Others, that are more important and fundamental, are still in full force; and by this Code (as well as by our *Statuta Antiqua*) our chief privileges and forms of administration, are legally defined; nor have we any internal power of changing them. When discussing questions of this kind with learned Foreigners, who have visited us since the general peace of Europe, I have a hundred times heard from their lips expressions and sentiments such as these—"National character is not the expression of a momentary sentiment, that may be put off and on like an outer garment; but is the natural and moral fruit that has been matured and ripened during successive ages: and free institutions are not only best in practical experience, but most secure and lasting, when they have grown with the growth of the State. It is this sentiment which gives them a firm root in the good affection of the people. History tells us that your aristocratic institutions have been favourable to civil liberty. Your aristocratic body has too many connecting links with the people not to respect their claims and civil rights, and too many privileges not to be a maintainer of social order. Hence, like a fly-wheel, it has preserved the steady movements of the machine of State, and has prevented those unseemly collisions between the executive and the people, which at all times are destructive of personal security and dangerous to reasonable liberty." Expressions of this kind may sometimes have been used as mere terms of courtesy or flattery; but many times, I doubt not, were the honest words of sincerity and good-will. Similar expressions I have heard, again and again, from Professors and other learned Foreigners, while discussing with us the antiquated and aristocratic forms of our old institutions.

Whatever may be the opinions of learned strangers, we believe that, on the whole, our laws and institutions have worked for the benefit of the country: and we owe a deep and lasting debt of gratitude to the memory of those royal patrons and benefactors from whom we derive our laws and privileges. We say not that our Codes are perfect, but we know and feel that they have become national and historical. It is impossible for any young man to be so dead to historical sentiments as not to feel some sense of moral obligation when he sits down every day in a Hall decorated with the portraits of Bacon, Newton, Barrow, Russell, Ray, Coke, Cowley, Dryden, Bentley, and other men who once lived here, and whose names will ever live (some with unspotted fame, others through evil report as well as good report) in the glorious annals of their country. We have a noble intellectual ancestry; nor can any power on earth take this honour from us; nor can any new institution share it with us; and this thought is in itself a true element of security and public good—All our studies and forms and fashions are historical. There are many customs amongst us which, in a new institution, might be thought burdensome, unreasonable, or ridiculous. But we should be far more unreasonable and ridiculous were we to abolish them: for they are the links that connect the past with the present; they tell us of stirring times in the by-gone days of literature and science; and they remind us also of past struggles in the cause of civil freedom, and of noble deeds done in behalf of religious liberty by those who went before us, and once filled the very stations in which it has been the will of Providence now to place us.

Many times I have heard the learned Foreigners who have come amongst us object strongly to the precedence we give (and by our laws and customs are compelled to give) to men of rank; and above all, to distinctions of Academic dress—such as the gown of the Fellow-Commoner, and the splendid robe worn by Noblemen during our high festivals. "Why continue," they have said, "these strange and useless customs, that are fit only to cause envy and heart-burnings among the Undergraduates? Such customs would not be endured, for a single day, in our Universities?" We have replied—that customs which have lasted for centuries, and have become historical, are not to be lightly parted with—that although Noblemen may claim certain privileges by Royal Statutes over which we have no control, yet are they subject to our discipline, to which they must yield obedience like our very humblest sons—that in our public examinations there is no show of personal favour or affection, and no privilege given to men of rank—that if at one end of our Hall a Nobleman have a place of honour, there is at the other end a table of intellectual precedence, whereon the names of all our Undergraduates are written in the very order they have won for themselves in fair and open conflict—that academic distinctions obtained in fair intellectual conflicts are not unfrequently the harbingers of public honours in society; so that one who has fought in our humblest ranks may sometimes send his son amongst us with the privileges of a Nobleman—that the external privileges of rank are not, therefore matters of heart-burning and envy—that, on the contrary, were they called in question and submitted to the vote of the whole resident academic body, old and young, they would be upheld without so much as one hand being raised against them.

To the *Statuta Antiqua*, and the Royal Code, have been added many by-laws, called *Graces*, passed from time to time by our Academic Senate, to meet the progressive wants of the University. These *Graces* are binding on the University, provided they contradict not our fundamental laws; but they may afterwards be modified or abrogated by new enactments of the Senate. This corporate power of enacting by-laws for the good of the University is a privilege of inestimable value. Any Member of the Senate may originate a by-law; but before it can be submitted to the Senate for its vote, and thereby gain the force of a Statute, it must first pass a committee, called a *Caput;* and each member of this body has the power of *veto* conferred on him by the Royal Code. Public opinion has generally been too strong for any flagrant and inexpedient exercise of this enormous power given to the several members of the *Caput.* It is, however, a clog to our legislation, and there have been some instances in which the caprice of an individual, leading to an arbitrary and inexpedient use of his privilege as a member of the *Caput*, has retarded the reasonable wishes of a great majority of the Senate. Nothing is more mischievous, in a corporate body, than frequent and petty legislation; and I should, on that account, grieve to see the *Caput* abolished altogether: but its constitution might be improved and its powers limited, either by a new Royal Statute, or by Parliament, without in any respect endangering the public good*.

It is not, however, my present task to point out the means of reforming or improving our body of Royal Statutes. What I contend for is, that the University, spite of certain clogs to its legislation, has, on the whole, done what was wise, and liberal, and for the public good; and that the present moral aspect of our body gives us cheerful and sanguine hopes for the future. Within the last twenty-five years, two or three

---

* Our present *Caput* is composed of six Members of the Senate: viz. the Vice-Chancellor, a Doctor of each of the faculties (Law, Physic and Divinity), and two Masters of Arts. It might, I think, be conveniently increased by the addition of five or six Members of the Senate. The effect of a single *veto* might be limited to one Term: so that a Grace so rejected might in course of another Term pass down to the Senate for its vote, provided it were sanctioned by a good majority (say two-thirds) of the Caput. We should have nothing to fear from such a change as this, and it might be brought about, I believe without any difficulty, by a new Royal Statute, which would be accepted by the Senate, and then become a part of our Academic Code. Within my memory the Caput has saved our body from many acts of hasty and unwise legislation, and has *very seldom* done us any injury. The power of *veto* has indeed been *very seldom* exercised. But I remember one not very creditable attempt at what might be vulgarly called *packing the Caput*, when a political question was to be submitted to the Senate; and about twenty years since the University suffered both inconvenience and great pecuniary loss by the caprice of a member of the *Caput*, who by his single *veto* prevented us from removing our old Botanical collection to a better site, and consequently from selling our old Botanic Garden, which would not, I believe, now fetch one third of the price it might have done twenty or thirty years since.

Roman Catholic gentlemen have resided in our Colleges, and attended the ordinary course of lectures. One of them afterwards gained the rank of Cardinal, and died at Rome. Within the same period, a young man, of the Society of Friends, kept Terms at Cambridge, conformed in all respects to our customs and discipline, and ended by carrying off one of our highest mathematical honors. And a few years since, a Turkish Bey, with a commission from the Sultan, came to reside amongst us. He was admitted at one of our Colleges, adopted our dress and customs, and attended the ordinary course of lectures. Before he left us he published an essay on the *Calculus of Variations*, which he presented to his friends as an expression of gratitude and good-will towards those among whom he had been living in friendship, and of whose studies he had partaken. It would, I think, be for the great benefit of the University had she the power, in cases such as these, of conferring an honorary degree, as a stamp of her approbation, and without the exaction of any religious test whatsoever. But we have no Honorary Degrees in Cambridge; and by our Academic laws, each student, before he proceeds to his first Degree, is compelled to sign the Registrary's book, which act implies that he is a *bonâ fide* member of the Church of England.

It may, perhaps, be said, by those who are unfriendly to our whole system of internal government, that we might, through the authority of Parliament, or by direct application to the Crown, have gained some extension of our powers in passing by-laws, some changes in our antiquated customs, and some modification of our tests. This may be true, and it is notorious that within the present century several movements have been made in this direction, and been defeated. Without pretending to discuss the policy of these movements, I may observe, that the resident members of the University, who joined in them, wished not for any great organic changes They sought not to sever the University from the Church of England; for they believed that the University and Church of England must stand or fall together. They found themselves joined by men who had neither derived any personal benefit from the University, nor knew anything of its internal government. Such men were ready to seek for academical reform at a cost the most liberal members of the University would at all times be unwilling to pay; and nothing was effected in such an incongruity of principles and motives. We asked for the abolition of a *religious test* before we conferred the honor of a *Degree* in Law, Physic, or Arts, upon any of our sons who had gone through our ordinary academic course, and conformed to our discipline; and in this form our Petition was presented to the House of Peers by the late Earl Grey. But after the presentation of a similar Petition (in which, of course, the word *Dissenter* did not appear) to the House of Commons, steps were taken for *The Admission of Dissenters* to the two old Universities under such a form as would have been, perhaps, subversive of our discipline, and would have produced an organic change in our constitution which the persons who framed the Petition never contemplated, and did not wish to sanction by their votes. On this subject I can speak with entire confidence, as I was one of a Committee that drew up the Petition in question.

Our endowments and privileges have of late years been the topics of envy and obloquy—sometimes even among men who have filled positions of influence in the State. Hence many University-men, otherwise favourable to a modification of our Statutes, may very naturally fear to seek for a doubtful and future good at the risk of forfeiting the great moral advantages of the position they now occupy, and the privileges it is their solemn duty to defend. I wish not, however, to detain the reader among doubtful questions of Academic reform, on which good men may differ, and I return again to the present moral condition of the University.

At the beginning of this century several debating societies existed in Cambridge, and in the year 1815 they formed themselves into one great Union, and a building was afterwards erected for their reception. Here our Undergraduates, and some of our younger Graduates, meet and read the daily Papers, and the periodical works of England, France, and Germany; and here also they meet, once a week during each Term, for the discussion of questions that are literary, philosophical, or political. No pitiful *espionage* controls their meetings. Their debates are not only open to the members of the Union, but to Academic visitors; and subjects of deep and moving interest are sometimes discussed with no small freedom. The Authorities of the University have any day the power of putting this Union down: but it is not put down, and no public evil follows. If any momentary evil may have arisen from the license of debate, it has been accompanied by a far greater good; for the debates of the Society are conducted on principles worthy of English gentlemen. Any expression, even in the heat of debate, in conflict with religion, would not be tolerated for a single moment. Such expressions might, no doubt, be silenced by authority; but no such authority is needed: for the young men themselves have a loyal attachment to the religious and social institutions of their country, and they know what is due to their position in society, as well as to the feelings of their fellow-students. And this is assuredly an inestimable gain to the religion of the country. A man who has learnt to pay external respect to religion, and to the sentiments of religious men, may learn in time to feel the power of religion over his own heart. But one who has been taught in early life to scoff at religion, and to make it the subject of ribald mockery and scorn—who has shut his eyes to the Book of Life, or seen it only through the distorted misrepresentations of a sceptic, mingling it perhaps with filthy jests, or with transcendental dreams and subtle fooleries—cannot become practically and truly religious by any thing less than a moral miracle. Such a one may, perhaps, become in after life a lover of solemn forms and pageants, and embrace a kind of poetical religion, as a thing that is graceful in society, and flattering to his taste and temper; but, after such a training in early life, it is hardly possible that the simple and humbling truths of Christianity should ever gain access to his understanding, or find an abiding place in his affections.

However this may be, our Undergraduates have learned the lessons of order, and tolerance, and patriotism, and liberality, and brotherly love, during the season of those youthful conflicts, which, under a different condition of Academic society, might end in irreligion, and faction, and hatred, and in personal encounters incompatible with moral order, and perhaps in blood.

Soon after the general peace of Europe one of the great Captains of Napoleon visited Cambridge, and spent several days amongst us. We listened to him with an interest indescribable, while he recounted to us some of the great historical passages of the preceding years; of which we had only read, but in which he had been an actor. He seemed to take a deep interest in our manners and institutions; and above all things he was delighted with the manly bearing, and joyous, but respectful, freedom of our sons. "But have you not," asked the French Marshal, "with all this free intercourse and liberty of thought and action, frequent quarrels and personal encounters among your Undergraduates?" We replied, that the practice of duelling was utterly unknown amongst us—that such a thing as an appeal to the sword was never thought of—that it was kept down by the power of our Academic laws, and by the stronger power of opinion among the young men themselves. He then remarked, that all this spoke well for the condition of our Society; and that a liberty such as was enjoyed by our younger members, would, in the Universities of the Continent, lead to "duels every week*."

Our Undergraduates, as a body, are orderly, patriotic, reasonable, and religious. Duels and other fantastical customs that disgrace the discipline of some Continental Universities, are incompatible both with our manners and principles. Those pantheistic dreams that are the bane of modern philosophy are almost unknown, even by name, amongst us. The mind of Cambridge is not prepared for the germination of such bad seed, or for the reception of idle transcendental visions that are as offensive to the elements of common sense as they are to religious faith. During the last two years, while States and Empires have been shaken to their foundations, we have seen the Students of several Continental Universities taking the lead in disgraceful civil broils, and fighting in the front ranks of lawless and murderous factions. Were like evils, by the will of Providence, now let loose on the society of

---

* In the year 1791 a duel was fought in the Devil's Ditch near Newmarket (fit place for such a bloody meeting!) by two Cambridge Undergraduates. One of them fell, and the victor in this miserable combat died not long afterwards in a state, it is said, of phrensy. I well remember the horror with which the event was commonly alluded to, more than forty years since, when I was myself an Undergraduate; but it is now almost forgotten. A sermon was preached on the occasion by Thomas Jones, Tutor of Trinity College—a person long since dead; who still lives, however, in the affectionate remembrance and veneration of his Pupils. The Sermon was published; but copies of it are now difficult to meet with, and are found only in private collections.

England, what would follow? I only speak the truth, when I state my conviction that every Cambridge Student would be seen on the side of social order; and, whatever might be his political name, that he would be ready to shed his blood in support of those institutions of rational freedom his fathers have handed down to him, and in support of that religion which in his heart he believes true, and which he clings to as the best security for public blessings, and the only foundation for his hopes of future happiness. I am not using the language of panegyric—I am writing the words of simple truth. Once more therefore I contend, that in our antiquated forms and historical remembrances we have a true element both of security and utility—that in what we have done for the last forty years—that in what we are now doing, and in the spirit that still breathes among us—that above all, in the moral and intellectual character of our sons, we have the firmest ground for our hopes of future good. Cambridge will, we trust, be true to herself: and Providence will then be on her side, and will carry her through her conflicts, and make her in centuries yet to come, what she has been in centuries that are gone, one of the living fountains of Sacred Truth, one of the brightest lights of English science, one of the best conservative elements of social and religious liberty, and one of the strong pillars of national glory.

§ 3. *Modern religious movements. Principles of the Church of England contrasted with those of the Church of Rome. "Tracts for the Times." Terms of Communion. Immorality of the "Tracts." Acts of Apostasy. Causes of error in our estimate of religious and moral questions. True Catholicity. Conclusion.*

While discussing the present condition and prospects of the University, there is another subject I have no right to pass over, though I touch upon it with great reluctance. Several of the metaphysical and moral writers of the Continent tell us that an inclination to what they call *piétisme* is one of the peculiarities of the British character. They remark, that party-names, such as High Churchman Low Churchman, Methodist and Puritan, that were at one time thrown out in scorn and mockery, and afterwards passed into the language of common use in England, have no good synonymes among themselves, because they want the living types of opinion which give to such words their fashion and currency. It is notorious that any strong abiding sense of religion, sinking into the heart and thereby influencing our course of life and moral sentiments, would be called *piétisme* by those who are irreligious; and in this sense of the word I trust that it always will be, as it long has been, descriptive of the manners and principles of Englishmen.

Religion, considered as a rule of life, is made up of doctrines, solemn ordinances, and moral precepts; and of external forms administered, in every Christian society, under some prescribed rules of discipline. There may be in a Christian society certain rules that are purely local and conventional, and, so far, rest only on expediency: but all the true elements of our religion are of equal authority so far as they are of divine command; and while we allow its divine authority we have obviously no right to accept one part of it and reject another, at our caprice or supposed convenience. To do this is to overturn the foundations on which religion rests. It is, however, true that sincere believers have taken very different views of religion, from the effects of early training, of national habits, and of natural temper. Some men are so framed as to receive the deepest moral influences through the senses; and, if they be religious men, they naturally learn to seek for spiritual support in external solemnities. Others are inclined to seek for consolation in a kind of mystical *piétisme;* and trusting to this element, they may perhaps overlook what is external to themselves, and in the end, may disregard some positive institutions of religion that are of divine command. In the latter part of his life Milton seems to have satisfied himself with this kind of *piétisme;* and it is the very life-food of monastic superstition. We cannot "overcome the world" by flying from it; for the world is the place of trial to which the God of Nature and Author of our religion has sent us; and there we have to perform our social, not our solitary task. Others again, looking only to what they consider the practical and social ends of religion, may perhaps be led to undervalue both its external ordinances, and the strong devotional sentiments, without which it cannot have coherence as a moral rule, or an abiding life as an inner and spiritual principle.

In the Church of Rome the religion of Bossuet differed from that of Fenelon—the Jansenist differed from the Jesuit—Pascal differed from Escobar and Molina. In like manner, within the pale of the Church of England, a High Churchman differed from a Puritan: and a Presbyterian of the Church of Scotland differed from an Episcopalian, whether of the Church of England or of the Church of Rome. Who was right and who was wrong in these conflicts of opinion, are points I do not venture to discuss: but writing historically, I may affirm that differences such as these are not to be set down merely to the score of political faction, or dishonest suppression, or a want of belief in the supreme authority of religion: but, on the contrary, that they take their rise from principles which are deep-seated in human nature, and ever have produced, and perhaps ever will produce, shades of difference in the practical belief and manners of Christian societies.

That these shades of difference existed at the time of the Reformation of our Church no one pretends to deny: and it is, we believe, historically true that our Formularies and Articles of faith were drawn up on a scheme of tolerance and comprehension. Whoever denies these principles, and endeavours to narrow the comprehensive scheme of our Reformers, whatever may be his honest opinions, is an enemy to our Church, and to that enlarged charity without which Christianity, as a rule of faith, would lose all its life and meaning.

But because our Church is comprehensive, it follows not that she remains without any well-defined external forms, and that she offers to her sons no tests for the security of religious faith. Every State has some constitutional principles to which its subjects owe a practical loyalty and obedience; and every religious community has some principles to which all its members owe a spiritual submission. Without the recognition of some principle such as this no society could be held in any continued union. The Church of England has prescribed forms for the administration of religious offices; and she has enunciated her fundamental doctrines in formal Articles, that are offered to the acceptance of her Ministers under the most solemn of all public sanctions. These Articles contain the grounds of her separation from the Church of Rome. If they be true, then was she justified in the formal act of separation: but if those doctrines of the Church of Rome be true which our Articles enumerate and formally deny, then must our Articles be so far false: our Reformers were in grievous and guilty error, and our Church is schismatical and heretical. No truth of common sense or history is more plain than this.

It would be worse than idle for me in this Preface to vindicate the principles of the Church of England, and to contrast them controversially with those of the Church of Rome. I profess only to write historically, and I wish only to speak of certain principles that are notorious and incontrovertible.

The Church of Rome acknowledges as Articles of Faith—the Supremacy of the Pope—the Infallibility of general Councils—the doctrine of Transubstantiation—the Sacrifice of the Mass—seven Sacraments—the doctrine of Purgatory—the Veneration of Images and Relics—the Invocation of Saints—and certain doctrines connected with Pardons and Indulgences. These Articles of Faith are formally repudiated by the Church of England. She denies them in expressions that are as plain and positive as any that can be found in written words. All of them she formally denies; some of them she calls "superstitious," "corrupt," "blasphemous fables, and dangerous deceits," "fond things repugnant to the word of God," &c. It is morally impossible to misunderstand the strength of this denial. It was at once the cause and the justification of our separation from the Church of Rome. After our separation we were still members of the visible Church of Christ, as it is defined in our 19th Article ; and we were still members of the Holy Catholic Church, in that enlarged and charitable sense whereby the Catholic Church is defined in the authorized words and solemn prayers of our public Service. By this formal act of denial we became also a Protestant Church—a name well understood, and which takes not from our primitive Catholicity: a name, moreover, of which Laud was not ashamed, and that is used by our Church as her true designation in one of her most august solemnities.

Two great principles were virtually accepted by the Reformers of our Church. First, the supreme authority of Scripture in deciding upon questions of religious faith and controversy.—This principle was not merely implied, but was formally enunciated.—Secondly, the rights of conscience and of private judgment in matters of religious faith. For the Reformers could not consistently deny to other Churches that liberty they themselves had exercised, and without which the Church of England could not have gained so much as a formal existence, or had a name among the members of the great Catholic and Christian community*. But there are many men who distrust and hate every movement in the direction of civil or religious freedom. Looking only to one side of our nature, they can see the evil consequences of human liberty, while they can discern no portion of its concomitant good. Our Reformers were not of this temper. They had a more enlarged charity—better hopes for the social destinies of the human race, and for the blessings, as they firmly believed, that Providence had in store for them.

---

* "If the Bible is the *sole* foundation of Christian Faith in the Church of England, and *not* the sole foundation of Faith to the Church of Rome, the authority admitted by the latter in addition to the authority of the Bible, must constitute an *essential* difference between the two Churches... When we appeal to our Liturgy and Articles, which is done only in arguing with those who have previously *acknowledged* them, we do not appeal to them as documents having validity in themselves, but as documents having no other validity than what they *derive from the Bible*; as documents which are only *so* far valid as they agree with the Bible. On the other hand, when a Romanist appeals to *Tradition*, as a Rule of Faith, he appeals to an authority neither *derived from* nor in any way *dependent* on the Bible. He regards *Tradition* as an authority which existed even before the New Testament: as an authority proceeding equally through Christ and his Apostles, though transmitted through a *different channel*; as an authority containing doctrines, delivered *orally* by the Apostles, and *recorded* in the works of the Fathers." These words are quoted from the *Comparative View of the Churches of England and Rome*, by Bishop Marsh, p. 3 and p. 4, (Cambridge, 1814). In the same work (p. 172 and p. 173) we find the following conclusion: "Though the Church of England acknowledges the right of withdrawing from its communion, if men cannot conscientiously remain in it, this does not imply an admission that there is no sin in *Schism*, or a separation from the established Church, in cases where *no plea of conscience* can be urged."... "Since we judged for *ourselves* when we seceded from the Church of *Rome*, we must allow others to judge for *themselves* when they secede from the Church of *England*," &c. This admirable work of our late Margaret Professor (Bishop Marsh) is out of print, and ought to be

It is, however, true that civil liberty may degenerate into a licentiousness incompatible with all good government, and that religious liberty may sometimes engender a spirit of sectarianism and fanaticism. No one denies these evil consequences of freedom. But on the other hand we may ask, whether history does not plainly shew us many moral evils of a more degrading character and a deeper die, which are among the natural fruits of a despotism that keeps the human mind in darkness, and destroys its healthy germination in the light of day.

Whatever may have been the consequences of the Reformation, whether good or bad, all honest and reasonable men were, for more than two centuries, agreed in one point at least—that the Church of England was widely separated in doctrine from the Church of Rome. The positive doctrines of the Church of England (such for example as the doctrine of Justification by Faith) may

---

republished. His short digressions on the political question of "Catholic Emancipation" ought, perhaps, to be suppressed in a new edition, as they have now lost all their interest, and only encumber the clear arguments and historical statements of the work.

no doubt admit of some latitude of interpretation. But her negative doctrines, like negative precepts in a code of morals, have a positive authority that admits neither of palliation nor honest evasion. No human sophistry can explain away those Articles (for example) whereby our Church renounces the Papal Supremacy, the doctrine of Transubstantiation, the sacrifice of the Mass, and Purgatory. Whether doctrines such as these be true or false, they are denied by the Church of England. On the strength of this denial she broke off her communion with the Church of Rome, and established a separate communion of her own, to which she admits her sons under some of the most solemn sanctions whereby mankind have been held in obedience to religious and social order. If we accept not her solemn decisions on points such as these, we may, perhaps, think fit to remain in her formal communion; but we cannot have the shadow of a right to take upon ourselves her sacred offices, or to stand up within the ranks of her priesthood.

Whether some strange doctrines of development may not have been tainting the speculations of certain members of our Church, or whether some scheme of rationalism may not have been eating into the vitals of their faith, I pretend not to inquire. As a matter of fact, the just Nemesis of a tottering faith has driven one set of Churchmen to cast away the sacred might of reason, and seek for refuge in authority; and another set to cast away both faith and reason, and to lose themselves among the disordered dreams and blighting mists of pantheism. One extreme often begets another; and, whatsoever may have been the cause, a new party has sprung up within the bosom of the Church of England, which, in one or two extreme cases of delusion, has led its victims either into pantheism or a demoralizing fanaticism. They began, like many other reformers, with a severe and somewhat ascetic rule of life. They seemed to be of pure and simple manners, and they were the champions of priestly authority. They professed to conform to the letter and spirit of our Ritual, and they revived certain minute and insignificant observances that seemed to have become obsolete through the lapse of time, and had been discontinued without any formal enactment, and apparently by silent consent. So far they had the hearty sympathy of many good members of our Church, who longed for a stricter rule of discipline, whose taste was gratified, and whose devotions were stimulated by the revival of antiquated forms and solemnities. By others they were suspected, and not without good reason; for it appeared, before long, that they were craving for some irrefragable authority they found not within the Church of England: and they were little content with Christianity as revealed to them in the simple words of the Bible, and put before them in the Formularies and Articles they derived from our old Reformers.—They told us (in the language of their leader) that our Articles were "the offspring of an uncatholic age"—that the members of our Church were "in bondage,"—that they were compelled "to work in chains"—that they were constrained to go on "teaching with stammering lips," "through the medium of indeterminate statements, and inconsistent precedents, and principles but partially developed," &c. &c.[*] Our Prayer-Book, they said, had the elements of a more perfect Catholicity, and its principles were to be "carried out" by a new and better kind of reformation.

But how was this modern reformation to be brought about? Not merely by employing the terms of contemptuous and bitter vituperation towards the framers of our Articles and compilers of our Liturgy, but by frittering away every proposition whereby our old Reformers had set up a test of Orthodoxy, and defined the grounds of their separation from the Church of Rome.—Our Church affirms "that whatsoever is not read in Holy Scripture, nor may be proved thereby, is not to be required of any man that it should be believed as an article of faith[†]"—"that we are accounted righteous before God only for the merit of our Lord and Saviour Jesus Christ by faith, and not for our works and deservings;"—"albeit that good works, which are the fruits of faith, are pleasing to God, and do spring out necessarily of a true and lively faith."—She further tells us, that "voluntary works over and above God's commandments, which are called works of supererogation, cannot be taught without arrogancy and impiety." She defines what she understands by the visible Church of Christ, and she positively and formally denies the infallibility both of particular Churches and of general Councils. In the interpretation of such Articles as these, so far as they are positive and dogmatical, men have differed widely in opinion. But in their plain emphatic words, as well as in the avowed intentions of their authors, these Articles also contain negations which, whether right or wrong, are levelled at certain doctrines of the Church of Rome, and admit of no honest evasion whatsoever.

---

[*] *Tracts for the Times*, No. 90.

[†] Article VI.

Again, the Church of England, as we are taught in her Articles, "hath the power to decree Rites and Ceremonies, and authority in controversies of faith." These words were never passed by the representatives of our Church in Convocation, and have on that account no fundamental Church-authority. They were introduced silently and without consent by some private adviser of Queen Elizabeth; they exactly fell in with her high notions of Supremacy, and they obtained the sanction of Parliament; and they were afterwards unquestionably binding on every member of our Church who had signed her Articles of faith, and given his unfeigned assent and consent to them under the sanction of an oath. But what do the words, above quoted, mean? Not that the Church of England is infallible; but that, as a body corporate, she claims the right of prescribing the terms of her communion, and the right of excluding from it men who differ from her in those points of doctrine and discipline which, as an expounder of the Word of God, she declares essential. This is Bishop Marsh's interpretation of the clause above quoted from the Articles; and it admits of no other without introducing a positive contradiction among the plain declarations of the Articles themselves. A similar authority is claimed by the Church of Scotland over those who are of her communion. Like the Church of England, she also asserts and maintains a spiritual authority in defining the terms of her communion; and in a memorable instance she, a few years since, expelled from her body a very powerful and popular preacher, because he held the doctrine of the peccability of Jesus Christ after he became incarnate—a doctrine which she believed unsound, and had repudiated.—How, indeed, could any Church continue in integrity and safety, if it had not within itself the power of prescribing the terms of its communion both on points of faith and discipline?

The Church of England is a true Member of the Catholic Church of Christ, but she does not on that account boast her infallibility. She is only so far infallible as she has drawn her doctrines from the Word of God. She despises not the helps of human learning, or of Tradition; nor does she overlook the decrees and determinations of Councils, or the opinions of the early Fathers of the Church: but she dares not put these old opinions of erring men in any authority commensurate with that of the Scriptures; but she rather uses them as helps towards the right understanding of the Word of God. Were this the right place for the discussion, I might also point out the wide difference there is between ecclesiastical polity and articles of faith. On questions of form and polity our Church *does* appeal to good historical *tradition*, and thinks herself bound by the model of the primitive Church of Christ; and on this ground (without at all swerving from the great fundamental principle of deriving her doctrines from the Bible, and the Bible only), she demands a conformity to her sacred rites and polity on the part of those who are members of her body. She believes that her teaching is true—that her forms are apostolical, and her doctrine evangelical—and believing this, she speaks with parental authority, and asks, in confidence, for the love and obedience of all the loyal sons of her communion.

Men are constantly craving for some infallible living authority to guide them on religious and moral questions. But neither the Evidences of our Religion, nor the limits of Church-authority, are put before us with the clearness of demonstration. Were it so, there could be no such thing as schism, for there could be no difference of opinion on religious questions: but we should thereby lose (as is admirably argued by Bishop Butler) one of the greatest and best elements of our probation; and our religious training would have no analogy to God's dealings with us in the natural world. Unity and peace are pleasant words; but while human nature remains what it is, the direst social evils may be lurking behind the outward semblance of peace and unity. Suppose the whole Christian world in a state of external religious unity brought about by Church-authority; might not intellectual stagnation among religious teachers, indifference among the people, cold-heartedness, and scepticism, grow naturally out of such a condition of society? Like a political despotism, it might, no doubt, extinguish some great social evils; but it would foster other and far greater evils; for it would stop the growth of those great Christian virtues that spring from Christian freedom. In such a state of things the world would not be the searching school of Christian wisdom that it is now.

All men take their religious principles for granted in early life, and many continue to take them for granted through their whole life: but an Undergraduate of Cambridge ought not to be in this condition. He may be called on to give *a reason of the hope that is in him*: and although the quotation of Church-authority may be a very good reason, and the best he has to give on some point in debate; yet it is but a sorry excuse for indolence and moral cowardice, and a desertion of those moral and intellectual struggles that belong to our probation. Such a desertion seems to be an act of disobedience towards God who gave us our reason, and enjoined us to use it honestly. These remarks apply to all members of the University, and to those especially who are destined for the ministerial offices of our Church. If any one meet with difficulties, let them be encountered by him in an honest and humble spirit, as a part, and very important part, of his moral probation: but let him not give up his reason by basely skulking from his high moral duties behind the shelter of authority. If such be his temper, he is little fitted for the work of a Christian teacher. The claim of infallibility is in itself no proof that a Christian community is right in its exposition of Christian doctrines; but on the contrary, is a very strong presumptive proof that such a community is in grievous error.

The Church of England prescribes the terms of her communion, and the rules of her discipline, and in so doing she exercises, as we have stated, an authority that is, directly or indirectly, claimed by every religious community in Christendom. The Church of Rome makes a like claim: but not content with this, she also affirms her infallibility; and, on the strength of this affirmation, has she many times carried fire and sword among men who conscientiously dissented from her communion. In doing this she was at least consistent with her principles. But if ever, before the sacred principles of religious toleration were understood and sanctioned by law, the Church of England have trodden in the persecuting steps of her elder Sister, she thereby not only committed great sin, but was utterly inconsistent with her own principles: for she has no claim to infallibility; and she had no right to deny to others that liberty she had claimed for herself, when she threw off the fetters of the Church of Rome.

Not to dwell any longer on the discussion of first principles, it is historically certain that the grounds of our separation from the Church of Rome are most plainly and unequivocally stated in our Articles. But some modern fanatics (and I have a right to call any men fanatics who try to enforce their opinions against the principles of common sense and the obligations of truth and honour) have of late years endeavoured to break down the barriers set up by our old Reformers between the Church of England and the Church of Rome. And how was this attempt begun and carried on? First, by an ascetic life—by a professed veneration for obsolete forms and antiquated authorities—by a subtle, but confused and mystical logic, and a form of reasoning utterly unlike any thing we now find among the honest and earnest writings of well-educated Englishmen. Secondly, by a bolder flight, in which the first principles of honesty and truth were cast to the winds, and a scheme of sophistry was distributed among the neophytes of a new doctrine, as transparent and as immoral as the very worst of those Jesuitical subtilties that called forth the incomparable irony of Pascal. I cannot enter at any length on a controversy of which the public is weary, and for which indeed there is little room in this section of the Preface: but I may notice, by the way, one or two examples of this demoralizing sophistry.

(1) Our Church affirms (Article xxi.), that "General Councils may not be gathered together without the commandment and will of Princes." So far the Article might be called political, for the clause has reference only to the royal authority and Supremacy. But our Church next affirms—that "when (General Councils) be gathered together (forasmuch as they be an assembly of men, whereof all be not governed with the spirit and word of God), they may err, and sometimes have erred, in things pertaining to God." And

what is the reply to this Article? "General Councils may err, *unless* in any case it is promised, as a matter of express supernatural privilege, that they shall *not* err."... "Such a promise *does* exist in cases where General Councils are not only gathered together according to 'the commandments and will of princes,' but in the *Name of Christ*, according to our Lord's promise[*]." To such an assertion we may rejoin—that all General Councils have been called together in the name of Christ, and that they are *not infallible* (as our Church affirms in her fundamental Articles of faith), *because* they are composed of erring men. There is (as we all allow) a promise to every faithful body of Christian men, and to every faithful Christian, of spiritual help; but there is no promise either of collective or individual infallibility. The Tractarian comment (above quoted) is but a covert attempt to fritter away a very plain negative proposition, the meaning of which does not admit the shadow of a doubt, and the establishment of which was essential to the lawful existence of the Church of England.

(2) In the following Article our old Reformers thought that they had erected an insuperable barrier between their doctrine and that of the Church of Rome. "The Romish Doctrine concerning Purgatory, Pardons, Worshipping and Adoration, as well of Images as of Reliques, and also invocation of Saints, is a fond thing vainly invented, and grounded on no warranty of Scripture, but rather repugnant to the

---

[*] *Tracts for the Times*, No. XC. p. 21.

word of God," (Art. xxii). We have here no question about the antiquity of this doctrine: it is condemned because it is a vain invention not grounded in Scripture. But what is the Tractarian comment? "The Doctrine objected to in this Article is "the Romish Doctrine."..."The Primitive Doctrine is not condemned in it"..."And further, by the Romish Doctrine is not meant the Tridentine, because this Article was drawn up before the decree of the Council of Trent." "The Doctrine condemned in this Article concerning Purgatory, Pardons, Images, Relics, and Saints, is not the Primitive Doctrine, nor the Catholic Doctrine, nor the Tridentine, but the Romish." &c.* A sophism more transparent and dishonest than this can hardly be met with in the writings of the older followers of Loyola.

The Church of England denies no true primitive doctrine taught by Christ and his Apostles. Neither does she close her eyes against good historical evidence where it may help her in the interpretation of the Word of God. But she denies (and partly on the strength of such denial she broke off from the Church of Rome) that there is any good and true primitive doctrine concerning Purgatory, Image-worship, or Invocation of Saints, resembling that which she in this Article condemns. An honest Roman Catholic would laugh any man to scorn who told him that the Romish doctrine held on these disputed points was not derived from a very old Tradition: and still more might he laugh to scorn any Protestant who dared to tell him that the Romish doctrine respecting Purgatory, Pardons, Image-worship, and Invocation of Saints, was not substantially the same both immediately before and immediately after the publication of the Decrees of the Council of Trent.

---

* Tract XC. pp. 23, 25.

(3) The doctrine of Transubstantiation, (or the change of the substance of bread and wine) in the Supper of the Lord, is repudiated by our Church; and she declares (Article xxviii.) "that it is repugnant to the plain words of Scripture, overthroweth the nature of a Sacrament, and hath given occasion to many superstitions." These words are plain enough, and I will not detain the reader with a Tractarian comment on them, that is worthy of the pen of a Molina. This doctrine had given rise, during many ages before the Reformation, to vain discussions and useless subtilties, by which the writings of good and learned men had been strangely mystified and disfigured. I have no wish to seek my way through the maze of school-logic in which the doctrine of Transubstantiation has been entangled: but I may state, while passing on, that if our religion is to have any logical basis to rest upon, this doctrine cannot be true. When St Peter began to preach Christianity he declared himself the witness of the Resurrection. And what proof had he of the Resurrection? The evidence of his senses. All the Apostles, including the one elected by lot to fill their number, had this essential evidence. What proof had the multitude of Christ's miracles? The evidence of their senses. Without the evidence

of the senses the authority and proof of a physical miracle is gone. Now the doctrine of Transubstantiation implies the existence of a physical miracle which is not the object of sense, but is contradicted by our senses. If it be true, it destroys the validity of that very evidence on which our religion mainly rests for its authority; and Christianity cannot stand the test of reason: yet are we enjoined, in the Word of God, "to give a reason for the hope that is in us;" and a life of faith is called "a reasonable service."

The real question for any Member of the Church of England (who has sworn to his literal belief in the twenty-eighth Article) is this:—what do the plain words of this Article mean, and what was the meaning intended by the Christian Convocation which drew it up and published it as a test of religious truth? What may have been the opinions of individuals, however wise and good, who lived either before or after the Reformation, is not the question. Such opinions may shake our faith in the Church of England, but cannot alter our honest interpretation of her Articles. I may, perhaps, venture to express my own conviction, that a repudiation of the doctrine of Transubstantiation would not have justified our Church in her separation from the Church of Rome, had not this doctrine been the natural, and almost inevitable root of other doctrines of most vital influence (whether for good or evil) in the practical teaching of our religion—viz. the doctrines arising out of the "Sacrifice of the Mass."

(4) The Church of England declares that the

offering of Christ, once made, is a perfect propitiation for all the sins of the whole world—"that there is none other satisfaction for sin but that alone" (Art. xxxi.) "Wherefore (she adds) the sacrifices of Masses, in which it was commonly said that the Priest did offer for the quick and the dead, to have remission of pain or guilt, were blasphemous fables and dangerous deceits." No human words could be plainer and more emphatic; and every Minister of our Church has sworn to his belief both in the positive and negative declarations contained in this Article. It is historically certain that it was levelled against the doctrines and practices of the Church of Rome; and that our Reformers broke off from her communion mainly on the grounds affirmed in this very Article. But what is the Tractarian comment on these most emphatic declarations? "Here (*i. e.* in Article xxxi.) the sacrifice of the Mass is not spoken of, in which the special question of doctrine would be introduced; but 'the sacrifice of Masses,' certain observances, for the most part private and solitary, which the writers of the Articles knew to have been in force in time past, and saw before their eyes, and which involved certain opinions, and certain teaching." "That the Article before us neither speaks against the Mass in itself, nor against its being an offering (though commemorative) for the quick and the dead, for the remission of sin;....but against its being viewed, on the one hand, as independent of or distinct from the Sacrifice of the Cross, which is blasphemy; and on the other, its being directed to the emolument of those to whom it pertains to celebrate it, which is imposture in addition*." I pass over the wretched verbal quibble founded on the word *Masses*, which happens to be in the plural number. It is impossible to affirm in stronger and clearer words than those of our thirty-first Article—that our Church repudiates *every Mass-offering* for the quick and the dead; *because* "the offering of Christ, *once made*, is perfect"... and "there is none other satisfaction for sin but that alone." We may affirm that no honest member of the Church of England can escape from this conclusion, and that the whole range of religious controversy cannot lay bare to us a set of assertions more evasive and fraudulent than the Tractarian comments I have just quoted.

(5) Our Church affirms (Art. XXXVII.) that "the Bishop of Rome hath no jurisdiction in this Realm of England;" and before any one of her Priesthood can be admitted to a place of trust or dignity he is compelled to swear—"that no foreign Prince, Person, *Prelate*, State, or Potentate hath, *or ought to have*, any jurisdiction, power, superiority, pre-eminence, or authority, ecclesiastical or spiritual, within this realm."—"This (says the Author of Tract 90) is the profession which every one must in consistency make who does not join the Romish Church."—Yet (with what to common readers must appear a strange *inconsistency*) he concludes his comment with these words:—"We find

---

* It perhaps deserves remark, that the parenthetical clause—"though commemorative"—did not appear in the first edition of Tract 90.

ourselves, as a Church, under the King now, and we obey him; we were under the Pope formerly, and we obeyed him. 'Ought' does not in any degree come into the question." The temporal Supremacy of the Crown may be a weak point in the system of the Church of England: but the Supremacy of the Pope is not merely political; it is also religious. Our old Reformers could not honestly have taken one single step had they not rejected the Supremacy of the Pope: nor could the Convocations (which settled our Articles and religious Forms) have conscientiously met together and deliberated, had they not been able to declare that the Pope *neither had nor ought to have* any ecclesiastical Supremacy in England. Denying conscientiously the Supremacy of the Pope, they had a right to make this denial a fundamental article of their religious Tests before they admitted any member of their communion to a Priestly Office. Such a person must swear that the Pope *neither hath, nor ought to have*, any spiritual authority in this realm: and "ought" *does* come into the question. Even the Author of Tract 90 could not long endure so flat a contradiction. He soon learnt to acknowledge that the Pope *ought* to have spiritual authority, and he apostatized from the Church of which he was a Priest, and from the faith of his native land.

I can encumber these pages with no more instances of Tractarian comment. But what (we may well ask) was the drift and aim of this kind of subtilty? The drift was plainly this—that a man who believed in the doctrines of the Church of Rome, and in his heart rejected the doctrines laid down by our Reformers, might retain his privileges as a member of the Church of England, and remain in her communion: nay, more than this—that he might swear to his belief in her Articles, and take on himself her most sacred offices. "Our Prayer Book (we are told in Tract 90) is acknowledged on all hands to be of Catholic origin; and our Articles also, the offspring of an uncatholic age, are, through God's Providence, to say the least, not uncatholic, and may be subscribed by those who aim at being Catholic in heart and doctrine*." But how is this made out? By sophistry as palpable as ever defiled the pages of human controversy. He who subscribes and swears to the Articles is commanded "not to put his own sense or comment" on them, but "to take them in the literal and grammatical sense." And again, he is commanded "not to affix any new sense to any Article." Plainer words were never written. Is (we ask) the Tractarian interpretation of the Articles literal and grammatical? Unquestionably it is not—Moreover *it is new.* There *may* have been dishonest members of Convocation, who said with their lips what in their hearts they believed not true. This is *possible.* But, historically, the Tractarian comment is *new;* and it is in most direct antagonism with the plain grammatical sense of our Articles, and with the unequivocal intentions of the Convocation which drew them up for the acceptance of the members of the Church of England.

---

* *Introduction* to Tract XC. p. 4.

The Author of Tract 90 felt the pinching nature of this reply. He allows that "the tenor of his explanations is anti-Protestant, whereas it is notorious that the Articles were drawn up by Protestants, and intended for the establishment of Protestantism." But then (he adds) "it is a duty we owe to the Catholic Church and to our own, to take our reformed confessions in the most Catholic sense they will admit; we have no duties to their framers*." The first clause of this sentence we all admit; but we do not accept the second. It is our *duty* to take the reformed confessions in a large and liberal sense, so far as we can do so honestly: but we have also a *duty* to the framers of our Articles; and it is our duty to accept their decisions on points of fundamental doctrine, where their decisions are unequivocal; for they are the authoritative decisions of our Church, and can only be set aside by a new formal act of Convocation. If we cannot in conscience do this, we may perhaps remain in the communion of our Church: but we cannot have a right to take on ourselves her ministerial and sacred offices; inasmuch as our Church exacts from every Minister, under the sanction of an oath, a subscription to those very confessions which were established by our Reformers.

Finally, our Author tells us, that the English Reformers "constructed the Articles in such a way as best to comprehend those who did not go so far in Protestantism as themselves."..."If, then, these framers have gained their side of the compact in effecting the reception of the Articles, let Catholics have theirs too in retaining their own Catholic interpretation of them." The conduct of our Convocation (he tells us) was like that of a French political minister, "who acted a double part, and had been caught in his own snare"!..."The Protestant Confession was drawn up with the purpose of including Catholics; and Catholics now will not be excluded. What was an economy in the Reformers is a protection to us. What would have been a perplexity to us then, is a perplexity to Protestants now. We could not then have found fault with their words; they cannot now repudiate our meaning*." Here, I think, the cloven hoof is plain enough, and has no embroidered shoe to cover it. In the avowed opinions of all good Churchmen, our Articles were drawn up in a spirit of comprehensiveness; and, both in charity and honest policy, they were made as little offensive, as was compatible with truth, to the wavering and hesitating members of the Church of Rome. But no honest member of our Church can be so blinded as to think—that where our Articles speak plainly they are without plain meaning—and that there is no essential difference between Tridentine doctrines, and those the Church of England publishes as true tests of orthodoxy, and enforces on her Ministers under the sanction of an oath. What conquests the Author was dreaming of when he wrote the words last quoted, I ask not now. All plain-dealing members of our Church did repudiate his obvious meaning; and he did at length, what he ought to have done sooner—he formally abjured the communion of our Church.

---

* *Conclusion to Tract XC.*

---

* Concluding words of Tract XC.

His severe and ascetic life—his great scholastic learning in the track he had chosen for himself—his ignorance of natural science, and his utter contempt for it—his subtle and entangled logic, involving the strangest incongruities—the boldness and novelty of his doctrines—all these things combined had a seductive charm to some minds, and had led them to gather round him, and to accept his teaching as if it had been oracular. Apparently to prevent alarm, he published a confession of faith and doctrine, wherein he contrasted, clearly and emphatically, his own religious creed with that maintained by the Church of Rome.* But his position was untenable, and there was soon to be an end of any dreams of conquest within our Church. While he was contemplating his final act of apostasy, his old friends in our Church might have mourned over him, as an erring Brother who had been entangled among the meshes of his subtle logic. But by his own acts he removed himself almost beyond the bounds of virtuous sympathy: for he told us—that he had long been in heart and principle with the Church of Rome while he was an outward member of our communion—and that his *Lectures on Romanism* *did* represent the sentiments of the Church of England, but (even at the time they were published by himself) *did not* represent his own. What was this publication, then, but a flagrant act of treacherous sophistry? And where is the Author now? He is a Priest of the Church of Rome; and he has published a new confession (whether sincere or not is a question for his conscience), that is a monstrous compound of Popery and Pantheism. For, in his final scheme, the Catholic faith is not a religion revealed to us in the Sacred Books we call canonical, and in the works of the Fathers which are supposed to contain the oral traditions of the Apostles and their followers: but a new pantheistic element is to be fastened on the faith of men—a principle of development which may overshadow both the *Verbum Dei scriptum* and the *Verbum Dei non scriptum* of the Romish Church, and change both the form and substance of primitive Christianity.

---

* *Lectures on the Prophetical Office of the Church*, &c. (Oxford, 1838.)

We have no right to blame, in a spirit of vituperative bitterness, a brother who changes his religious creed: but we have a right to demand from him an observance of the vulgar rules of truth and honour, while he endeavours to draw others to his new opinions. The drift of Tract 90 is this:—viz. that a man may hold the doctrines of the Church of Rome, and remain a Member and a Minister of the Church of England. To give so much as the shadow of a ground for such a conclusion we are called on to prove that, on the questions of Supremacy, Purgatory, Pardons, Adoration of Images, and other important doctrines condemned in our Articles, the Romish Church underwent, during the long sittings of the Tridentine Council, a *substantial change of* opinion. But the Romish Church admits of no such change:

and no man living knew better than the Author of Tract 90, that on all the points on which he argued, the Romish Church *was the same*, in substance and in letter, before and after the sessions of the Council of Trent. Nor is this all. The statement of Tract 90 (viz. "that by the words *Romish doctrine* (in Article XXII.) is not meant the Tridentine, because this Article was drawn up before the Decree of the Council of Trent,") is not historically true: and it was proved by the present Bishop of Exeter (in a Charge which shewed both great historical knowledge and logical skill), that on some of the important doctrines, which our Church makes a ground of separation, the *Tridentine Decrees* WERE *published before the promulgation of our Articles;* and that the words of our Articles were put in such a form as to be in specific and verbal antagonism with these Decrees of the Church of Rome. To this statement, by the Bishop of Exeter, no reply was ever, I believe, attempted; and it is final and incontrovertible.

It might have been thought impossible, that, among well-educated Englishmen, any principles could gain a currency while they were in open conflict with the honest use of reason and the plain maxims of truth and honour. But there is a moral contagion in fanaticism which enables it, in a time of novel excitement, to trample on the most sacred principles that are binding between man and man. It is not so much the subtilty and sophistry, as the hideous immorality of Tract 90, that I wish to lay bare before the Undergraduates of Cambridge. Were its principles accepted by Englishmen, there would be an end of their upright bearing and manly sentiments—there would be an end of that plain-dealing which is the sure foundation of mutual trust and good-will. Candour would be no longer the virtue of a Christian. Candour, said one of the new school of fanaticism (now, like his Master, an apostate from our Church) is not the virtue of a Saint. We, on the contrary, believe that candour is a sacred element of Christian purity and holiness. It is a portion of that enlarged charity without which our faith would only be "sounding brass and a tinkling cymbal." If such opinions as I am here condemning were generally accepted in our Academic Society and acted on, Cambridge would not stand against the virtuous indignation of the country for another quarter of a century: and much as I love and honour the College in which I live, I hesitate not to say, were such a state of sophisticated morals and mental reservation to become general within these walls (which God forbid!), the sooner they were pulled down the better.—Soon would they fall in ruins; and no honest plain-dealing man could be asked to join us in mourning over them.

Let me not be misunderstood.—I condemn not all the Oxford Tracts: for many of them are straightforward, just, and true, and well fitted for the times in which we live. Some are mischievous because they are crooked and mystical. Others are radically false and palpably destructive of the best elements of charity and Christian truth. Speaking for myself, I might say that I drew from them some pleasure and profit, and that I never suspected or saw their drift, till I read in 1836 the Preface to their second Volume. I thought it plain that the Author of the Preface did not believe in the doctrine of Justification as it is clearly stated by our Reformers (Art. xi.). It may be true that some members of our Church may have misunderstood the doctrine of *Justification by Faith only*, and may have been led into grievous and fatal sin by neglecting the practical duties of a holy life, and the sacramental means of grace which Christ established and commanded us to make use of. But the Author of the Preface tells us (or seems to tell us)—that the sacramental symbols may, without superstition, be offered to an infant or to a dying man in a state of insensibility: because "such practices had the sanction of primitive usage." As if no errors of doctrine had risen up even in the times of the Apostles, and no very foolish and superstitious acts had been ever done by the Christians of the first three centuries! He seems to regard a Sacramental rite as spiritually efficient—not because it is celebrated by us as an act of Faith done in a spirit of obedience, and enabling us to realize and make our own the great fact of Redemption, and helping us to lift our souls towards our Redeemer's throne in heaven—but because it is an *opus operatum* (a kind of charm, differing in no respect which I can comprehend, from one of the fancied charms of Pagan worship), the efficiency of which is in some way or other independent of its symbolical meaning and of an exercise of faith. If this were his meaning it was in plain contradiction to our eleventh Article. It seemed spiritually to degrade the Communicant while it magnified the Priestly Office; and to insinuate the doctrine of Transubstantiation, or of some new sacrificial offering which differs from that one offering which is the object of our faith—the offering of Christ which was made *once for all, so that there was to be no more offering for sin*—which alone our Church acknowledges in her 31st Article, where she formally repudiates every other offering. What was at first suspected and feared, was in the end realized in that final Tract of most immoral sophistry, which is a stain on the literature of our Church and was the natural prelude of an act of apostasy.

But what, it may be said, has the previous discussion on the Oxford Tracts to do with the history of Cambridge studies, and of our modern manners and opinions? The reply to this question needs not many words. I have, with plain truth, spoken some good of Cambridge; but I should be wanting in that candour I have in words commended, were I not to admit that there have been some facts in the recent history of our younger members which tell not to our credit. Some years since the Cambridge Camden Society was established, mainly for the purpose of promoting the knowledge of Ecclesiastical Antiquities. Its objects were excellent, its members were numerous, and some of them did good service in promoting the studies for which their Society was organized. But a narrow, fanatical spirit sprang up within one party of them.

Their writings were not merely damaged by faults of taste, and fantastical puerilities, but were vitiated by some grave errors of principle. Some of them seemed to have taken up a religion built upon the principles of taste, rather than upon more solid reasons drawn out of sacred and historical evidence. They learned to speak of the Architects of the Middle Age as men religiously inspired, and of our old Reformers as a set of Vandals and infidels. These figures of speech soon passed into ideal realities. At one of the meetings an Undergraduate read an elaborate architectural Paper, ending with a kind of religious or moral dissertation, in which he seemed to declare that Cranmer, Latimer, and Ridley died at the stake, by the just judgment of God, for having consented to the desecration of our Monasteries. Some expressions of this kind might be rhetorical and figurative: all of them were not. The working of the Society became suspected, and its oldest and most influential members withdrew from it in a body. It then lost its vitality and strength, and soon came to its dissolution. And well was it for Cambridge that this Society died a sudden death: for, without denying that it had done and was doing some good, it was, in the opinion of many, a very thriving school of foppery and fanaticism. Very soon after its dissolution one or two of its active members went over to the Church of Rome.

It would be folly to suppose that the Oxford Tracts did not find their way to Cambridge, and work some evil here. A few, happily a *very few*, of our Undergraduates seem to have accepted the demoralizing principle of Tract 90, and to have had one kind of faith for the University, and another for their closets. One Graduate, of considerable scholastic attainments, was indulged by his College with a set of chambers (to which he had no customary claim), where he carried on the work of private tuition. A case of apostasy among his pupils provoked suspicion. His publications were examined and were thought to be tainted with fantastical and superstitious opinions savouring of unsound doctrines. He was therefore deprived of an indulgence that some thought he had abused. And what followed? He publicly went over to the Church of Rome: thereby justifying the previous suspicions that had arisen against him; and proving, that while the College had been treating him with indulgence, he had been acting towards them with treachery. In another case, a Bachelor of Arts asked for a College Testimonial, that he might become a candidate for Deacon's Orders. The Testimonial was refused, on the ground that the candidate had published, not long before, a little work that was thought puerile, foolish, and superstitious. But he was of unblemished morals; and I can state positively, that on a second application his Testimonials would not have been refused, had he expressed any honest regret at his previous conduct, and given any rational grounds of hope that he would not repeat any similar acts of folly. But nothing of the kind was done, and he also went over to the Church of Rome.

These are the only two Cambridge cases of a moral malady, engendered by the concluding doctrines of the Tracts, which teach us that we may hold one set of religious opinions while we profess another. There are amongst us no predisposing causes for the reception of such a moral disease as this. We were unscathed and hardly touched by the pestilential vapour which came amongst us; and it has passed over us like the shadow of a cloud that leaves no track behind it. No man of weight and authority surrendered his faith to the demoralizing subtilties evolved in the last volume of the Tracts. There is not, I believe, so much as one Cambridge man, out of his state of pupilage, who would not heartily repudiate them. Our faith remains unchanged in principle; but it is firmer and better rooted than it was before the recent shaking of opinions. It is however notorious that, within the last twenty years of religious movement, many members of the Church of England have passed over to the Church of Rome, and among them were some Undergraduates and one or two of the younger Graduates of Cambridge. But among them was not so much as one who had any weight or authority while amongst us—who had carried off our high Academic honours—or drunk deep at our fountains of learning.

Once for all I may remark, that if any man be persuaded that the Church of Rome has truly determined the Scripture Canon, and rightly interpreted its sacred books—and if he moreover believe that in addition to the *Verbum Dei scriptum*, she possesses the true *Verbum Dei non scriptum* embodied in her Traditions, and of like authority with the written Word of God—and if, believing all this, he also believe that the Tridentine Decrees contain a right summary of the doctrines and Church-polity that are honestly drawn from these two sources of religious authority—then, in such a condition of belief, it is impossible for him to remain an open and honest member of the Church of England, and but one plain and righteous course is open to him. With such a one I have no dispute ; for I profess not here to weigh the doctrines of the Church of England against those of the Church of Rome. But before he takes his final step of apostasy from the faith of that Church in which, by God's will and by no choice of his own, he was engrafted when a child, let him remember that he owes a very solemn duty to the country of his birth, to the baptismal font where he was first sprinkled, to the schools where he lisped his first confessions, and to the altar in sight of which he took on himself those very vows, which had been first made in his behalf by those who took on themselves the solemn obligations of his Christian Sponsors. If he desert the faith of his Fathers without most solemn deliberation, and a long and most severe sifting of Christian Evidences, he commits a deadly sin in his first step of apostasy, while he passes over the threshold of a new Temple—dedicated indeed to the God he has long professed to worship; but with other forms of celebration, and other vital doctrines which his mother Church repudiates. Still more is his apostasy to be condemned, if it be, after all, but an act of moral cowardice—of one who, having been pledged at his Baptismal Font to be a faithful soldier of Christ, flies from that moral warfare and probation which are the trials in a Christian soldier's battle-field—and flinches from his duty, by throwing the responsibilities of a rational being upon the authority (falsely called irrefragable) of erring men. The faith of Christ implies the willing obedience of a reasonable soul, not the bondage of an unthinking slave. It asks for that obedience of the heart which is utterly incompatible with a slavish and blind obedience: and if, after we come to man's estate, we do change our religious creed, the change must be made on the evidence of an enlightened reason, and not as a sorry excuse for shifting from ourselves the deep responsibility of the right exercise of reason. No movement begun in this way can be otherwise than hateful in the sight of God. It is, in truth, a rebellion against the God, both of Nature and Revelation, who gave us reason as our highest and most glorious endowment when rightly used; whereby truth and falsehood are rent asunder and put as things separate before the conscience; and without which, no endowments, whether temporal or spiritual, can be of any lasting value to mankind.

Falsehood and fanaticism have a mighty power of propagation. They not only beget their likeness, but they often beget their opposites. Rationalism has led some men to blind submission. Popery has led to Pantheism, and Pantheism to Popery. Church-tyranny begat iconoclastic fury; and iconoclastic fury has been known to re-forge the fetters it had cast off. Truth has been so bedecked with falsehood, that men could hardly see her form; and she has, in the folly and fury of debate, been so tossed above the regions of common sense, that it seemed she was never to find a resting-place within the level of human apprehension. Often has she been so bandied about that, after many a shock of opinion and recoil of thought, the combatants have lost their breath; and she has ended with neither side, but fallen prostrate on the ground between them. These are not idle figures of speech and vain inventions; but are forced on our thoughts by some of the gravest and plainest facts in the history of man.

Conclusion.

Before I bring this Preface to a close, I wish again to remind the reader that it is in the first place addressed to the Cambridge Undergraduates; and that it has been drawn forth by some grave errors of opinion, more or less current in the world, on physical, philosophical, and moral questions. Hence its tone (almost from first to last) has been controversial. Some may tell me that it is written too strongly and vituperatively. But why should I not write vituperatively, if I think I see the truth, and at the same time see the germination of opinions which deserve to be condemned? I have, however, written with personal bitterness to no man living; for I know not personally, and, perhaps, shall never see the face of one of the Authors on whose writings I have animadverted, with some severity it may be, but certainly with no personal dislike or ill-will. I have no wish to smoothe over, with words of unmeaning courtesy, actions and sentiments which I think deserve to be condemned. Courtesy is an excellent thing between man and man, because it helps to foster charity; but we serve the ends of charity very ill if we set up courtesy at the cost of truth. It may, I think, be well, in these concluding paragraphs, to point out some of the moral causes of error both in philosophical and religious questions.

1 One cause of error is self-worship and a wrong estimate of our faculties, which prompt us to be teachers while we ought to be learners. We may soon learn to think ourselves all in all to ourselves, and that we stand in no need of external teaching or religious help. A Pantheist, on some such ground as this, pretends to look down upon inductive knowledge, and disbelieves in God. A Deist, out of the same elements of human nature, rejects the teaching of Revelation. And a proud Formalist and Rationalist—who does not know his own condition, and thinks that he stands in no need of a Redeemer—though he call himself a Christian, cannot (with any thing less than a moral miracle) accept the humbling, and at the same time the exalting truths of the Gospel.

2 Nearly allied to the preceding source of error, though apparently its very antagonist, is the self-love of timidity and mere moral indolence; which leads a man to cast away the highest duties of his probation, and to shelter himself under authority. This may be sometimes

a mark of moral cowardice and self-distrust, and of nothing worse. But we may know it by its fruits; and it is commonly no proof either of true charity or real humility. For men of this temper, when they have once taken a side, are often seen among the bitterest advocates of intolerance and party violence. Having shorn themselves of the noblest attributes of intellectual freedom, they can have no tolerance (whether their adopted opinions be right or wrong) for freedom of thought on the part of other men.

3 Another most prolific source of error, sometimes very like the former (and no wonder, for all moral errors are engendered in the soul by the father of lies, and his whole progeny have a strong family physiognomy), is a condition very common in the mind of man, which leads him to stop short in the way of truth, by mistaking the means for the end—second causes for first causes—partial truth for universal truth; and teaches him to dwell among such elements of imperfect knowledge, and to worship them, as if they had within themselves the form and excellence of the highest truth. Human imagination and pride help out this kind of delusion: for men are ever ready to believe that while they stand still on the road that conducts to the temple of universal truth, others have no right to go farther than they have done.

This bad principle is so wide spreading, and puts on so many shapes, that I know not well what name to give it: but for want of a better we may call it the *idolatrous element* of human error. It is shewn in the faith of the material Pantheist, who, comprehending some of the laws of material nature, is so blinded by them that he can discern nothing beyond them; and therefore makes his idol out of the material world. It is seen in the faith of the ideal Pantheist, who, realizing no truth but through the conceptions and creative energies of his own mind, believes in no other and higher power of thought or creative energy; and therefore idolizes his own conceptions, and turns man into a God. This is the idolatry of a modern Hegelian mystic, who thinks to gain strength by despising the means of knowledge, and the steps by which only we can ascend to it—who thinks himself before the world, while he is only backing into the ancient slough of Pantheism.

The same bad element of our nature has wrought itself also into the vitals of religion—taught men to worship forms and deify symbols—to speak of the Church, not as a nursing mother, but as a goddess exempt from all the weak attributes of humanity—as infallible as the teaching of demonstration addressed to the natural reason, or as the teaching of the Word of God addressed both to the enlightened reason and the heart.

It is a sound rule in logic that an argument which proves too much proves nothing. Men will not apply this rule to themselves, but they are ready enough to apply it to others. And thus it is that idolatrous errors, as before stated, beget their opposites, and drive mankind into a denial of legitimate authority, and a contempt both of the forms of Church-polity and the use of the external symbols of faith—though the one have the sanction of Apostolical example, and the other be ordained by the command of God. On questions of form and polity it would be desperate folly to despise the lessons drawn from experience and antiquity; and on questions of faith no teaching can rise higher than the Word of God, or pretend to reach its level, except by the honest use of enlightened reason applied humbly to its interpretation. But the idolatrous element of our nature has led men far out of this track. They will boast of Catholicity while they are putting on fetters which cramp the energies of reason, without which we can have no apprehension of universal truth. They talk of Catholicity while they refuse to pass their eye round the whole horizon of truth—while they see but down one narrow vista, and their vision blinks to all other illumination. They know not, and acknowledge not, the grand Catholicity of truth, and that exalted faith which tells us that truth cannot contradict itself, and that the perception of truth, however feeble and glimmering it may be, is a perception of a light that comes from God. They talk of Catholicity while they refuse to drink at any of God's fountains of knowledge, but such as have passed through their own narrow filter. But worse than all, while their vision is one-sided and dim, their ways are crooked. The holy ends of truth are to be reached by putting truth herself in abeyance; and charity, her natural offspring and the end and aim of all religion, is, on the maxims of a new creed, to be immolated before the altar of formality, and the miserable worship of a party idol.

If this idolatrous element of error have led men far aside from the right track of truth, what has followed! Other men by a natural recoil, and seeing only one side of human error, and having a new idol of their own, have started away in a right opposite direction: but if the ways of men are crooked, though they start off in directions that are opposite, they may soon come round and meet again—moving onwards deviously, and thus completing a vicious circle wherein truth can never dwell. If there be a fearful Nemesis of Faith, there is also a fearful Nemesis of Reason: and these two ministers of vengeance will wreak their fury on men who bow before the idolatrous element of their nature, and overlook the upright homage that is due both to faith and reason. They will distract one man into a belief that he is a champion of the Church of England, while he is abusing her old Reformers—that he is advocating the cause of truth, while he is teaching the principles of falsehood—that he is promoting knowledge by dealing out among his dupes the very worst puerilities of medieval superstition. They will drive another to a worse form of phrensy—to set up a pantheistic Rationalism in the place of Christian love—to worship Atheism in masquerade—to fall down before stocks and stones, while he denies a personal God who redeemed him, and a personal Maker and providential Ruler of the Universe.

Many a time, in my younger years, have I wondered, when turning over the Bible history, at the falling away of the old people of God into the sin of rank idolatry. But I forgot, or did not know, that this proneness to idolatry was only the manifestation of a strong principle in the breast of man, which has had its modes of worship in every shifting scene of his history:—that Pharisaical homage was but idolatry in another shape, fitted to a more advanced condition of society—that bigotry in every form—that the crotchets and caprices of fashion and folly—that political names and factions—that many other things which defile and make turbid the current of human life, may be looked on as the offsets of the same bad principle of our nature.

No man can shake off this idolatrous element altogether. There is lodged within him the principle of self-love: and he has within his bosom a religious element which is sure to break forth in some shape or other. Hence, if he have falsified his nature, that should lead him onwards and upwards, and if he have closed his eyes to external teaching, he is sure to set up some crooked idol of his own, and to prostrate himself before it. It is notorious that bad and irreligious men are often superstitious. We have not to ransack the pages of ancient history to prove this point: the proof meets us now at every turn. Those who reject the teaching of the Church of Christ—who see nothing in the sublime Theism taught by Moses, and in the impure Idolatry taught by the Egyptian priests, but different grades of development in the opinions and dreams of men—who reject the Prophetic writings as the offspring of ignorance and imposture—who tell us that the Gospel is but a myth, and Christianity but the accomplishment of an Hegelian vision:—such men, with this ample capacity of unbelief in what is true, and a like ample capacity of belief in what is false, will turn round and ask us to become wise and rational by denying God and deifying the elements—by denying a provident and personal Creator, while we make mites from the touch of a galvanic wire, and, by a natural magic, breed lions out of seals, elephants out of whales, and men out of monkeys! Infidelity and superstition are twin-sisters. There are miracles in Nature: and if we deny the being of the God of Nature, what can we do but make ourselves the grovelling worshippers of some material idol? And thus we see men and women, who can draw no good lessons from past experience, and have no veneration for that sacred truth which is every good man's solace through the ills of life and by which society is held together, willingly making themselves, in the light of day and in despite of reason, the veriest dupes of a juggler and an impostor.

There lodge within the nature of man many bad principles, which, if not kept down by the power of truth, unite themselves with his self-love and breed some vain conceits and superstitious forms of a sensual religion, whereby he learns to stop short in his conceptions of the true and spiritual service he owes to his Creator. A poor savage may worship a deformed idol made by his own hands. He acts in conformity with the promptings of nature; and he can rise no higher, because he has been taught no better. But a Christian formalist, who is lacking in charity, has a worse idol lurking in his bosom; for he offends against better knowledge.—We know, but too well, that there have been men who have trampled on all law, and yet been the slaves of idolatrous superstition. They have soothed their consciences with some acts of antiquated mummery, and then gone back to deeds of violence and lust. They have gone through acts of maceration as if they could thereby pay off their score in their account with a God of purity; and then had nothing to do but begin a new account of abominable sensuality. It is the very soul and essence of idolatry to confound the means of religion with its end. We cannot be religious men if we use not the means which are of divine command; but while we use these very means, if the heart have no share in our homage, we may only be blinding our conscience, and pandering to our self-love, and to the idolatrous element that lurks within us.

4 Another fruitful cause of error, nearly allied to the former, and often making a part of it, is the energy, and, sometimes, the despotism of the imagination. We may well believe that the imagination was intended, by the Providence who gave it to us and made it a part of our inner nature, to have a mighty influence over the belief and conduct of mankind: but it was never meant to triumph at the cost of better knowledge, or to rule over the actions of men without the sanction of enlightened reason. Its best office is to cooperate with reason by influencing the heart and affections; so that reason may not be a mere cold and inoperative assent to truth (whatsoever the form of which may be); but

may be carried out, and shine before men, in the acts of daily life.

Men are often driven mad through their senses: and it is imagination that mainly helps on this madness. We are all acted on more powerfully by a public speaker than by a didactic essay, though it convey the very sentiments of the speaker. In one case, we have the lively sympathy of the senses acting on the imagination, and the contagious influence of association with a crowd of fellow-listeners. In the other, we have the mere cold acquiescence of reason. But the former is not necessarily better than the latter: nay, it may be ten times worse; for, in cases where truth and falsehood are mixed together, and can only be separated by the calm decisions of unembarrassed reason, it may become a mere theatrical emotion that leads us from the truth.

This kind of effect belongs to what the ancients called *hypocrisis*, but is by no means to be confounded with what we now call hypocrisy. In theatrical emotion a man for a short time cheats himself—in hypocrisy, his very aim is to cheat his neighbour. But we must ever bear in mind that sincerity in our emotions (especially during moments of strong social sympathy) is no test of the truth of our principles. A poor Hindoo in his life of horrible torture and maceration is no doubt honest to his own principles; and when driven mad by the stirring influence of the multitude around him, and the fumes of an idolatrous excitement, he throws his body under the bloody wheels of a great

Idol, that he may be crushed to death; he has a religious belief which, though horrible in its forms of worship and hateful in the sight of God, is, at the moment, as sincere and strong as the faith of a Christian martyr.

Music, splendid pageants, and architectural decorations, may produce a strong sensual emotion—more than this, they may become the powerful handmaids of religion; but in themselves they are not religion. And, worse than all, they may teach us to stop short and dwell among these mere sensual implements; thereby so fostering what has been called the idolatrous element of error, as to make us uncharitable toward a Christian brother whose worship is more simple than our own, and little satisfied with the plain unimaginative teaching of the Gospel. In such a case (and it is perhaps not an uncommon one) they are far worse than nothing—they may become the very implements of falsehood—the ministry of a spirit of darkness who knows how to cover his deformity under an angel's wings.

It is absolutely certain that men, calling themselves Christians, will pass from the extravagance of theatrical emotion to the extravagance of sensual indulgence; and with such persons Religion herself, or something which takes her name, may become the minister of a refined and subtle sensuality. Under the delusions of the imagination men will talk of Catholicity who have stripped themselves of all the attributes of universal truth—who neither give to faith what belongs to faith, nor give to reason what belongs to reason. The religion of the Jew (so far as it was formal and external) was confined and localized, and appealed very powerfully to the imagination: but in his faith (so long as it was pure) the idolatrous element was kept down by terrible denunciations against idolatry, by prophetic and spiritual teaching, and by the expectation of a higher and better teaching, that, in God's time, was to grow out of his national faith and polity. A Christian, with this example in his memory, has no right to shut out the imagination altogether from its office as an accessory of religion; for he believes that the religion of the Jew, sprang, like his own, from the revelation of God: but it is, at the same time, his solemn duty to keep watch against the abuse of the imagination.

If in the material world we can trace the elements of an *archetype* through all the changing forms of animated nature, so also there is a *moral archetype* that shines through the shifting forms of God's moral dispensations. The spiritual element is the same—the forms and shadows differ: so that the moral accessories of one period cannot be shifted to another, without mischief and incongruity. The religion of Christ is not national, but universal,—not provisional, but final. The God we worship is the God of all Nature: our religion is a revelation of truth for the good of all mankind. If we overload our religious worship with ceremonials so as to forget its spirit—if we so localize our conception of the Godhead that we cannot lift our hearts towards our Redeemer's throne without turning our faces to an altar built by the hands of man—if, in the same spirit, we seek for religious solace in shrines and pilgrimages, and homage done before the dry bones of men—in such homage as this, working through the imagination on some of the most delusive feelings of humanity, we but fall back upon the elements of a local worship and a narrower faith; or, worse still, into a personal idolatry, not one jot more reasonable or less sensual than the idolatry of the heathen.

Is then our religious faith to have no helpers and accessories? We say not so. The religion of Christ embraces every atom of the moral world. Imagination is a noble part of our moral nature, that ought to have its proper nutriment, and we have no right to starve it. To do so would be but another very mischievous form of idolatry—the offshoot of spiritual pride. Not only did the religious solemnities of the Jews appeal to the imagination, but the inspired writings of their Prophets were often invested in its most glorious decorations. We cannot, therefore, on religious grounds, banish all appeals to the imagination: what we contend for is—that faith is not an acquiescence in a principle which merely solaces our taste—that imagination may be the helper and minister of religion, but is not the foundation on which it is ever meant to rest. If so, it can never have any solid enduring influence as a rule of life.—It will shift with every caprice of fashion, and its whole fabric may be blown over by some puff of new opinion. The Apostles of Jesus made their first strong appeal to the senses, and not (speaking strictly) to the imagination. They appealed also to the reason: for they argued (we may dare to say logically) from the sacred and historical documents that were in their hearers' hands. They appealed to reason, and also to that direct evidence of sense, which all men are by their nature compelled to believe in and to act upon. They had the overwhelming evidence of facts and the stern realities of life so instantly before them, that they had little to do with appeals to the imagination. Yet in pondering over the simple and unadorned narrative of their labours, the imagination becomes more inflamed than by gorgeous pageants, or the poetical decorations of human skill, however highly wrought: and while we read the Acts of the Apostles, we can believe ourselves, for a moment, members of the faithful band of Christian soldiers who fell on Paul's neck and kissed him, sorrowing that they were to see his face no more; and we can go with them in spirit to the sea-side, and hear their parting prayers in a temple not built by the hands of man, which had for its music the roaring of the waves, and for its vaulted roof the canopy of heaven.

It is plain that men will boast of their Catholicity whose religion is sectarian and one-sided, and has none of the true elements of a faith that is universal. They forget that, while the essentials of religion remain as constant as the attributes of God, forms and fashions, and all things that belong to the outer garb of human sentiments, are in continual change and movement—and that ceremonials, which at one time might be the useful and almost necessary accompaniments of religion, may be incongruous and useless at another. Hence it is that they worship forms, and postures, and antique dresses, till their imagination, working on the idolatrous element that lurks in the bosom of every son of man, leads them to a conception of religion that is confined and sensual; and to a narrow apprehension of the sanctity of universal truth, and the holiness of universal charity and love. In such a state of idolatrous excitement candour ceases to be a Christian virtue, and the ends of religion may be sought at the cost of honour and plain dealing.

I write not of ideal evils, but of realities that mark the times in which we live: and vices and follies of this kind continually propagate some opposite form of extravagance. Idolatry of forms in one party breeds a contempt of all forms in another. Thus we may read, in essays written within the walls of our old Universities, that medieval art was the offspring of inspiration as much as the writings of Isaiah or St John. Folly such as this cannot stop short of sensual idolatry. And other essayists, beginning in the same school and professing to give its doctrines a wider Catholicity, dare to tell us, that medieval inspiration, and the inspiration of the Apostles, and the inspiration of all genius, Christian and Heathen, are one and the same thing: and thus a sensual idolatry of the works of man passes naturally into the worship of man—into Rationalism, which stifles the true spirit of religion; or Pantheism, which drives God from our thoughts while it deifies the world he has created. Nor are these the only forms of fanatical extravagance. Another set of men, hating the evils of a sensual idolatry, and in their hearts longing for religious truth, seek it by casting off all allegiance to the Church, and all sympathy with the present fabric of Christian society. They seek for a public worship as simple as that of the first Christians who had neither churches nor social rights: and they not merely reject all forms and decorations; but, to resemble the first little band of Christians, they would abolish the rights of individual property, and have all things in common. It is certain that these men, however sincere and honest, have neither practical wisdom, nor an enlarged and enlightened knowledge of the Word of God. Their faith has not the semblance of Catholicity; and though they may be honest in their sectarian fanaticism, they only play the game of modern political Socialists, and of bad men who would wage war to the knife with art and science, and the form and substance of Christianity, and the rights of property, without which Christian civilization could never have risen up and shed its blessings on the world.

In the modern essays, to which I have been alluding in this part of the Preface, there are, I think, many proofs of the deluding influence of bad and uncatholic sentiments. That there are essential truths in religion which every one who deserves the name of Christian must believe, and that there are also some essential forms in the ministrations of religion, no one pretends to deny. But there are forms that are unessential; and to dwell upon them as matters of party strife, and to magnify them above measure, and at the cost of charity, is no mark of a true and reasonable Catholicity; but it is, on the contrary, a proof of intolerance and sectarian bigotry. We admit the lawful authority of our Church, and we give her a willing and lawful obedience; we believe her teaching true, because it is founded on the Word of God; we partake of her celebrations, we accept her means of grace, we join in her humiliations at the visible evidences of God's wrath, at her thanksgivings for the removal of a pestilence, and her worship for the blessings of daily life. All this we do, acting at once in obedience to God's commands and the honest voice of reason. But we offer not a slavish homage made at the sacrifice of reason, or think our Church infallible in her peculiar forms and appliances of the Word of God. She is made up of fallible men; and has no strength but what she derives as an honest dispenser and interpreter of the promises revealed to us in that infallible Word.

But if we be surrounded by so many difficulties that stand in the way of sacred truth, and there be no infallible human guide to conduct us through them, how may we escape from them? We reply, that no man living can escape from them altogether. They form an essential part of his moral probation. The real question for every son of man is this—How shall he conduct himself, amidst the difficulties which surround him, so as to be at once a good subject of the State, and an approved servant of his heavenly Master? It is his duty to conform to the ordinances prescribed by the Church of which he is a true member, and to which he owes allegiance. If he do this, it is so far well.

But the duties of public worship imply also the duties of private devotion; and if these be wanting, then must his conscience tell him that his public profession is a mockery and a heartless formality. If our faith be not a mere mockery and delusion, we must be led by it to drink daily at the fountains of sacred truth—to study the Word of God—to accept it as teaching us the means of grace and the rule of life—and to conform our lives to the spirit it enjoins. If we do this honestly we cannot go far wrong; for the principles and rules of Christian life are intelligible to a child: and it is our most plain and practical duty to test our lives continually by the Word of God. If we can read such a passage as I have extracted in a preceding page, and our conscience tell us that our lives do conform to its spirit, it is well for us, and we may go on our way rejoicing[*]. But if while reading such passages (for example) as we meet in the concluding chapters of St Paul's Epistles, we find that they have no practical illustration in our course of life—then, whatsoever be our knowledge and whatsoever our name and position among men, we are but wayward children in our Father's sight, or rebels against his law.—This Preface is not, however, an essay either on the principles of religion or of philosophy. It professes only to point out to the Undergraduates of Cambridge some of the common errors by which they are beset, and in their behalf to raise up a voice of warning: and this part of my task is now very near its close.

---

[*] Supra, p. cclxxxi.

Speaking more generally of the hopes and fears of a great academic body like the University of Cambridge, I think (as already stated) that we have nothing to fear from material Pantheism; and we have very little to fear from the ideal Pantheism which has, of late years, so much distorted the teaching of one large metaphysical school of Germany. It is ill suited to the homely and practical mind of an Englishman; and, most fortunately, its clumsy, unwieldy, and untranslatable terminology forms a barrier over which our truth-loving students will not be willing to pass. But we have something to fear from modern Rationalism: for we also have our Rationalists, who instead of humbly taking the Word of God as their food of life, are willing to cull from it only what suits their taste, and to carve out from it only what pleases their palate. Much, also, have we to fear from an antagonist form of error, which leads men not only to accept the plain teaching of the Word of God, but to add to it both doctrines and observances which cannot be found within its letter, and to set them up as if they were of divine authority and sanction. And these delusions are the more dangerous, because they fall in with that bad, selfish, and idolatrous principle, which leads us to magnify our own works, and to pride ourselves in our individual services; as if they were a kind of fee which we could pay our offended Maker as the price of heaven. Thus, for example, the Bible enjoins the practice of self-denial and abstinence from sensual sin: and starting from this principle, which is most plain and true, a formalist will build upon it a scheme of asceticism and religious maceration; as if a God of mercy loved human suffering *for its own sake*, and thought it *meritorious*. A patient endurance of the severe trials and crosses our Father puts upon us, is a most essential part of our moral discipline through life. A voluntary infliction of pains and macerations is no part of God's teaching (which commands temperance, but commends not abstinence), and is a superstitious insult on His benevolent attributes. A religion of this kind is pharisaical in principle; is the food of infidelity on the one hand, and of monastic superstition on the other; is a part of creature-worship; and is the best ally of Pantheism. And we need not wonder at this; for it is the very essence of idolatry to stop short among the formalities of religion, and make them (or it may be the Priests who administer them) the objects of superstitious worship. Pantheism does the same thing. It idolizes Nature, and worships Man. Hence it is that Superstition, Priestcraft, and Pantheism, naturally pander to one another.

What then should be our soul's high aim? A genuine and not a spurious Catholicity. The soul is to be wedded to all truth. The God of truth is to be our worship. The sanctity of truth is to be upheld at whatever price: and any teaching—moral, political, or religious—which tampers with this sanctity, is to be abhorred and cast off from thought, as the foul teaching of the very spirit of evil. Such a faith as this may, under God's favour, gradually raise up within us an abiding spiritual principle that keeps devotion alive, while it informs the moral part of man, purges his senses, and draws out the highest and best development of his reason. Thus guided, he may learn to see the God of Nature and the God of Revelation in every thing around him; not with the eyes of a sensual pantheistic idolatry, but with the eyes of Christian faith.

We study the wonders of Creation, and we believe in a personal Creator. So far our reason teaches us; but we are surrounded with difficulties, doubts, and darkness, if we go no farther: for by nature we see but in part, and we neither comprehend the attributes of God, nor the whole scheme of His Providence: hence, if we dwell too much among the material elements of Nature, we may become Sceptics, Idolaters, or Pantheists. But Religion steps in and helps us, and instructs us by a brighter and better light; and by her teaching we learn our duties as social men, and we learn also the lessons of a practical obedience which looks beyond the world of Nature for its sanction. Her lessons are not drawn from the maxims of sectarian bigotry, or any narrow scheme of man's invention. The whole horizon of glorious truth is set before us; and we are permitted—nay, so far as we have capacity for the task, we are enjoined—to turn our eyes to every part of this bright horizon. But we see not Nature (and Religion is a part of Nature) only through the eyes of visual sense; but with the eyes of reason, purged, expanded and sanctified by the influence of faith, whereby we discern, and believe in, things far beyond the ken of sense. In this way our hopes of personal fruition, and of future good, rise far above any earthly teaching, and reach the level, not of what we can conceive intellectually, but what we discern spiritually, of the great scheme of Providence: and under the guidance of this teaching, difficulties and doubts and dangers vanish, one by one, in our contemplation of law and order and benevolent arrangements among the visible works of God; and the dispensations of human life, painful and mysterious though they may sometimes be to uninstructed sense, are beheld as the means of our probation, the instruments of mercy, and the ways that lead to purity and peace.

The scheme of teaching in a Christian University should not, therefore, be either narrow or sectarian; but should be reared on the wide basis of universal truth, all parts of which are in unity. Our body is made up of many members, each working in its proper place for the good of the individual man: so also the great body of human knowledge is made up of limbs and members that are not to be mangled and disjointed—are not to be like neighbouring kingdoms, in frequent warfare, sometimes interrupted by a hollow truce—but are to be knit together for one great purpose—the glory of the Creator, the good of man's estate, and the domination of harmony and love. A great trust has been committed to the University of Cambridge, and on the whole she has used it, we believe, to her own honour and the great good of the State; and as the wants of society have become expanded she has shewn a readiness to give a wider basis to her services in the great cause of truth, whether physical, social, or religious. On this subject enough has been said already.

In bidding adieu to the Undergraduates, it may be for the last time, I profess not to be their teacher in what they have to learn here, except in one rugged walk of science in which Providence has made me their guide for more than thirty years. The greatest and best part of their teaching is committed to other hands. My task in this Preface, as I have already told them, has not been so much to teach them what they are to learn, as to tell them what they are to shun. I have raised a warning voice to tell them of slippery paths on which they may fall, of dark obstructions over which they may stumble, of hazy visions that may lead them far astray, of a Siren's voice of false philosophy that may tempt them to make a wreck both of earthly honour and of religious hope. But I may claim an old man's privilege, and I do so in a spirit of truth and good-will, and tell them that they are compassed round with social and moral dangers—that they are open to obloquy and envy—that if they do not their best, now that they are young, to fit themselves for the social duties of manhood, there are men ready to tear from them every privilege on which, it may be, they pride themselves too much, and which they may forfeit in dishonour before they are old. Indolence, sensuality, and indifference to the high teaching of physical, moral, and religious truth, will be their loss and shame. No matter what their rank and station, they must sow the seed in youth, if they hope to reap the good harvest in after-life, and to do the work to which God and their country will appoint them. And sensuality is not the sin of a moment. It breeds mischief in all coming years. It poisons the very fountain of thought by fastening on the imagination and the memory, and cannot be washed off by human tears or mere human penitence: but it haunts us, like a demon, in every virtuous resolve and every attempt at a holy and consistent life. Worse than all, it is a rebellion against that Holy Spirit of God who is our religious counsellor and guide, and without whose strength our resolves are good for nothing, and we are sure to fall short even in our own poor standard of moral duty. I ask the Undergraduates then, by the feelings of high patriotism—by their love of honour—by their dread of social shame—by the claims of conscience, and by the duties it tells them that they owe to themselves, their country, and their God, to begin their Academic task with the earnestness and the hope and the humility of Christian men—not in a spirit of worldly strife, but in a spirit of piety, charity, and love. I ask them to give their heart's best homage to the cause of universal truth; to love candour and plain dealing, as a part of truth; to abhor sophistry as a part of falsehood. Let them begin in this temper, and go on in good heart, and believe that their early labours will not be in vain, and that God will be their helper; and, looking no farther than the prizes of this world, that, if they fail to reap the rewards of earthly honour, they may reap rewards which are far better, in the brightness of a pure conscience, and in the happiness that ever dwells with Christian hope.

I never had the pen of a ready writer, and my constitution abhors all sedentary labour. This Preface has not, therefore, been brought to a close without some pains, and many interruptions from bad health, and from engagements which now begin to press hard upon me: but in the performance of my task I have done my best to discharge a small portion of a great debt of gratitude and love I owe to the University of Cambridge. Under her fostering care I have now lived more than forty-five years. And what changes have come over the face of Society during that long period! Few indeed are left of the friends and companions of my early life. In a very few more years, should they be granted me, I shall reach that age which the Psalmist makes the limit of man's life; and beyond which, should life be lengthened, all its added years are "but labour and sorrow." Little space have I therefore either for hope or fear in my prospects of a future residence within these College walls: and poor indeed would an old man be if nothing beyond worldly hopes were left him. But we can live our life over again, and dwell among past years in memory. And we should learn the lessons of humility and truth from such a retrospect. History is a worthless tale, and the retrospect of past life but an idle dream, if they teach us no lessons of prudence, of heavenly wisdom, of mutual love, and of hope that soars above the world of sense.

We may, also, sometimes amuse the imagination by innocent historical visions of the future: but we have no moral right to evolve such visions from the soul, and build them on any other basis than a firm belief, that individual men, and bodies corporate, and states, and empires, are but instruments in the hands of God to work out the ends of his Providential will; and that each and every one of them must fall away and come to open shame (in the very course of Nature, which is but the visible working of God's will) if they fail in that part to which He has appointed them. Speaking for ourselves, we can have no good hope for future blessings upon Cambridge, but that which rests on the good she has done to Church and State—by being in deed, what she is in word, "the school of sound learning and religious education,"—by being the honoured channel of conveying to the children of the State the pure streams of accumulated knowledge—and by teaching her sons, as the social end of all they learn, the lessons of high and holy bearing, of Christian honour, of piety, and truth, and love.

But have we no signs for fear in our historical visions of the future? This is not the condition of Christian Europe. Individuals, and States, and Empires, have each of them their appointed task, and it is by difficulties, temptations, and dangers that they are tried, and from which, if they acquit themselves as the true servants of Providence, they come purified like a precious metal from the fire. In the early years of this century, England looked like one vast battle-field, and the sons of Cambridge for awhile threw off the gown, and took up arms in defence of religion, and liberty, and all a good man cherishes. This was the condition of Cambridge the year I first saw its College walls. But God blessed the arms of England—the terror of invasion passed away—and the University gradually went back to its ordinary habits of peace and study. There rose up, however, in Europe a mighty Empire, and God seemed to fight on the side of its hosts, till kingdom after kingdom fell before it; and in a few years more, all Europe, from the frozen regions of the North to the warm valleys of the South, was in one armed league against these Islands. But this great hostile Empire began in violence and blood: and as it rose it was not governed by the maxims of justice and humanity. The humbling lessons of Christian truth had no place in its affections, and it paid no right honour either to civil or religious freedom; for it was driven onwards by the lust of domination and the thirst of spoil. It was, then, no fit instrument to uphold the cause of truth, or to carry out the ends of Providence in Christendom; and it fell from its high throne because the God of Nature fought against it.

Europe was afterwards, by the will of Providence, blessed with a peace of more than thirty years. But how did the nations, the rulers and the people, profit by the hard lessons of adversity? Kings were slow and heartless in doing that which they had promised in the hour of danger, and the people were ready to rise in deeds of lawless violence. The greatest Empires of Europe were wasting the precious years of peace in preparing the materials of war, and consuming the very vitals of the State in accumulating the implements of aggression. I need not tell the consequences of this unchristian and tyrannous policy. We have seen enough of them, or heard enough of them, in the revolutions and battles of the last two years. Peace is once more established in Europe; but it is the peace of brute force, which, for a time, has put down lawless violence. It is not the peace of loyalty, cemented by good-will and mutual trust, and based on Christian principle; and it has, therefore, none of the enduring elements of stability. Bloodshed, revolutions, and civil broils, are the bitter fruits of a policy which burdens peace with all the cost of war, and leads by inevitable necessity to an utter destruction of national wealth, and a loss of national honour.

England, thanks to Providence, has been free from many of these horrible evils: but we cannot be calm spectators of the clouds that seem still to be hanging over Europe, and portend a coming season of storm and tempest that may wreak some part of its fury on this country. And have we no social evils of our own to disturb our prospects of the future? Famine and pestilence have been doing the work of death in these Islands—*united*, alas! too often but in name. Poverty, and misery, and sin, meet us at the corners of our streets, and cry out for help. New forms of infidelity and new fashions of immorality are continually starting up amongst us. The diffusion of knowledge (good, and excellent, and conservative as true knowledge is) has brought up the rankest weeds of quackery and empiricism. None are willing to be learners; all are striving to be teachers; and every man seems ready with some physical or social nostrum. In the study of worldly gain we may follow, and follow wisely, the promptings of our inner nature; and a worldly man may be the best practical judge of the means of his worldly interests. But in teaching the lessons of moral duty and religious truth, we have to teach a man to keep down the first promptings of his inner nature, and to subdue himself: and if in this struggle he be left only to the promptings of his nature, unrestrained by the strong arm of law and untamed by the persuasions of religion, we give him over as a slave to the very soul and spirit of evil. We may talk of the accumulations in the store-houses of mammon from the fostering influence of free trade, but let us not dare to tell our fellow-men of free trade in piracy and rapine and human blood.

More than forty years since, England stood erect among the nations of the earth by a great deed of self-denial, done in antagonism with the spirit of worldly gain, and in honour of religion and humanity. And what is the posture of England now? Her Parliament is reformed, and so far it may be well. But men are now found in it, who have strength of purpose and great worldly shrewdness, and who deal out the maxims of commercial wisdom, and talk loudly of national wealth, while they forget that the noblest portion of a nation's capital is invested in its honour, its morality, and its religion. And the rulers of our land have sometimes seemed to truckle to these worldly men; not yet indeed by proclaiming a free trade in the life and blood of our fellow-creatures, but in sharing, under the specious mask of righteous commerce, in the profits of human slavery, and thereby fostering crimes which defile and make abominable the face of some parts of Christendom.

Wilberforce and Clarkson are no more. They learnt their early lessons of humanity at Cambridge, and their names are still held in love and honour here. But the sons of the very men who were first banded with these Christian heroes, in a most righteous warfare against piracy and rapine, seem almost to have forgotten the lessons of their fathers; and in our days few of them lifted up their voice when the cause of freedom and humanity was in its utmost peril, and England was sliding downwards into a policy which taught her to cast off the honours she had won by former struggles:—to become an accessory to hideous crime, and to barter for a portion of its profits; while her laws, and the voice of Christian humanity not yet stifled among her children, withheld her from openly joining in its abominable perpetration. And what fruits have we reaped in this bad harvest? Some of our Colonies are ruined; others have been in rebellion; and all around us seems involved in darkness and in danger.

And what better could we look for from a vacillating policy, which has dared to look for profit in expedients, which are at the cost of consistency, humanity, and holy principle*?

---

* I have no wish to discuss in this place a question that is merely political; but no question that bears on our national morality is out of the scope of this Preface. In the early years of this century the Slave-trade was declared illegal by an act passed during the short Whig administration. This act was the brightest glory of the Party; but its brightness was dimmed and tarnished by a disastrous policy introduced by the representatives of the same Party in 1841. Some of the members of administration contended, at the time, that their new policy was not inconsistent with their old principles; and that the horrors of the Slave-trade would not be aggravated by it. It is a very great stretch of charity to believe that the statesmen who used these arguments did so in sincerity. A crooked and inconsistent policy draws forth false, sophisticated, and crooked arguments. At any rate, the event has shewn that these statesmen were mistaken; and that the Slave-trade, with all its complicated horrors, was enormously increased after 1841 by the new demand the slave-workers looked for in the English markets. It is a lamentable fact, that by our voluntary change of policy we have increased the victims of this infamous and bloody traffic by the addition of tens of thousands. How could it be otherwise? We encouraged the slave-dealer to run greater risks, and make far greater efforts, than he had done before, in the hopes of direct or indirect remuneration from his open dealings with this country. Where was the consistency of maintaining an armed fleet to suppress the Slave-trade on the coast of Africa, while we were paying the slave-worker in South America for produce obtained by means most abominable and unchristian, and partly raised by the hands of the very men who had been dragged away from Africa in spite of the watchfulness of our cruisers? Our law makes it immoral for a British subject to traffic in human blood and bonds. Is it not then immoral to pay a foreigner indirectly for doing an act of immorality that is forbidden to an Englishman? There is but one intelligible answer to such a question as this. England by her new policy committed a great national sin; and she is now reaping, and will long continue to reap, the bitter fruits of it; and the worst of all these bitter fruits is the loss of national honour.

But it was said in 1841 that England had long been inconsistent—that she admitted (for example) the cotton that was grown in the Slave-states of North America. Let us, for argument's sake, assume that she was inconsistent. Were we on that account to undo what good we had done in the great cause of humanity? If we had put down a great national sin, and some other countries refused to tread in our steps, This is, thank God, but one side of the social picture. England dares to look her social evils in the face; and we trust that she may long flourish (spite of all the evils

were we on that account to retrace our steps, to go shares with these countries in their most unrighteous gains, and to encourage them in doing that which our law forbad, and pronounced vile and infamous? Were we to do nothing in the cause of freedom, because we could not do every thing? Because we could not put down all crimes, were we therefore to do away with all penal laws, and proclaim a free commerce in sin? No one could, perhaps, be found so impudently absurd as to give a positive reply to such questions as these. Yet absurdities not one jot less gross were bolted by some of our statesmen who vindicated our change of policy in 1841 on the score of our previous inconsistency.

But the main argument, drawn from our supposed inconsistency, wants the shadow of a foundation whereon to rest. England before 1841 was not inconsistent in her dealings with the great slave question; and her honour was then untarnished. She had no right to dictate to other nations on a question of their internal polity. She could trade with Turkey, though the Turkish Empire was despotic and Mohammedan. She could trade with North-America, though its Southern States were unhappily defiled by domestic slavery. North-America did not drag slaves across the Atlantic to cultivate her cotton-grounds; and English merchants could honestly deal with its Southern States, without violating one single principle of that great moral act of our Parliament which abolished the Slave-trade. Neither (by such commercial dealings) did our merchants violate those other acts of Parliament which denounced this trade as a crime for which every Englishman was amenable to the severe laws of his country, and counted as felonious and infamous by every honest subject of the realm.

But we may imagine a new case. Let us suppose the United States to conquer a new country—to incorporate it, as an additional State of their National Union—to cover it with cotton and sugar plantations,—to re-establish the African Slave-trade,—and to cultivate their new plantations by yearly introducing among them slaves dragged, by tens of thousands, from the coast of Africa. In this hypothetical case, would England be morally right, or politically consistent, in dealing with the new State and buying its sugar or cotton produced by this new effort of Slave-labour? Common sense and Christian morality tell us that in so doing she would be most shamefully inconsistent with the noble spirit of her former legislation, and grossly unchristian in going out of her way to participate in gains drawn from foreign works which her laws have denounced as immoral on the part of her own subjects. A case like this never has, and we trust never will, occur within the dominions of the United States. But if it did occur (to the great disgrace of English blood) it would be in strict analogy with that encompass her), blessed by good laws, and sanctified by high principle; and that she may help to teach the nations of Europe wherein their true safety lies, and *that civil freedom is compatible with peace and social order.* In this way may she become the nurse and pattern to other nations less blessed and honoured by Providence than she has been. And she has a higher duty still, which she owes to the many millions of her fellow-subjects who are in heathen darkness. She has to diffuse among them the light of Christian freedom, and the blessings of Christian hope. If this be indeed her task, and she perform it faithfully, then will she

---

some other cases in which England, since 1841, has forfeited her consistency, greatly lowered her national honour, and, at the dictation of an unscrupulous and daring body of men, has sacrificed Christian principle to supposed commercial gain.

The abolition of the Slave-trade was a great moral and Christian victory gained after a battle of twenty years. The leaders, who were victors in this battle, are gone: but their sons and representatives, through sheer cowardice, are now beating a shameful retreat, and gradually losing the honours their fathers had won for them. Any retrograde movement, after such a struggle, is enough to fill the breast of a good Englishman with shame, and make him despair of the future glories of his native land.

It cannot, at the same time, be denied that the most intrepid of the abolitionists were not always true to their avowed principles, and that they did not altogether keep good faith with the British Planters. Neither were they always wise in policy, however humane and Christian their avowed motives: for they forgot that men who had lived as slaves could not be fitted at once for civil freedom. Humanity and wise policy pointed to a gradual abolition of colonial slavery—secured by the active supervision of men whose hearts were in the work of humanity. But gradual abolition, or any gradual training for the full enjoyment of civil rights, little satisfied the impatience of men, who in the pride of a recent victory were obstinately resolved to gather its fruits before their season. Whatever share of blame may rest with conflicting parties, we know that some of our colonies are ruined; and Christian patriots think that no acts ever passed by the representatives of England since the great revolution in 1688 were more disgraceful, and more pregnant with future mischief, than our sudden change of policy begun in the year 1841.

have indomitable strength against all powers of darkness: for she will be an honoured instrument in the hands of God for diffusing the lessons of wisdom and truth, of peace and love, to the remotest regions of the earth. If this be indeed her glorious task, and she perform it faithfully, the God of peace will be on her side, and will give her strength and victory in all her coming struggles.

Returning once more to the moral duties of the University, we may tell our sons that in the lessons of wisdom we may draw from the retrospect of the past, from the fruition of the present, and from the dim visions we can form of the future, we see motives for good hope, not unmixed with fear. This is the nature of man's probation in every age of society; and without these mixed conditions of humanity we should lose the highest and best lessons of our moral training, and of our moral duties in social life.

The discoveries of physical science are a part of a nation's strength and glory: but these discoveries may, under a narrow and one-sided teaching, lead us to a base material fanaticism, that would drive the thoughts of the God of Nature from the world, and lead us into Stygian darkness. Again, the inventions of mechanical skill are, or ought to be, the poor man's boon and blessing; for they abridge his toil, and throw the strain of human production from the sensitive framework of his body upon the dead implements of nature. But has the vast progress in mechanical skill brought out a corresponding advance in peace, and love, and social purity, and Christian happiness? We know that the very contrary is too often true—that mechanical discoveries and manufacturing skill have brought with them a want of steady balance in the productive dealings of the country—fits of feverish prosperity followed by fits of collapse and misery—accumulations of vast wealth to the few—squalid poverty, vice, and misery to the many. Are we then to stop the progress of mechanical discovery, and fall back into the primeval condition in which each man eats only the fruit produced by the sweat of his own brow? No man is so mad as to wish for this, or to deny the blessings of commercial wealth and mechanical discoveries. But we do affirm, that while mechanical inventions and manufacturing industry have been called out by the thirst of gain and the seductions of mammon, few corresponding efforts have been made to subdue the social evils that grow out of the corruption of the heart—and that mechanical inventions and manufacturing industry bring no durable strength and safety to the State, if advancing society be not held in check by moral and religious training, and the Christian lessons of humanity. The wisdom of Providence knows how to bring moral good out of physical evil. The folly and wickedness of man has too often drawn moral evil out of physical good.

Art may pander to immorality; poetry may be the impudent handmaid of sensuality; the vilest crimes and the most withering despotism may lurk under the external forms of civil freedom. Do we then say that freedom, and art, and imagination, are worthless things?

Not so. They become worthless only by their abuse; and they may, under the guidance of high principle, be the ministers of true liberty, social virtue, and national glory. At every shift of government and every turn of fortune, we see bad elements springing up to blight our hopes, and disturb our foolish visions of some new form of human perfectibility. And how can it be otherwise, while the moral and religious elements of society are either starved, or glutted, it may be, with unwholesome food? In the British revolutions great crimes and great blunders may have been committed on every side; but the supreme authority of morality and religion was never made a matter of public mockery and scorn by any party in the State; and our Constitution at length settled down with a full recognition of the supreme authority of moral and religious principle; and so it has lasted well.

But the struggles for freedom without principle are no better than the struggles of a madman with his keeper. Idle metaphysical dreams, schemes of popular worship, and the fantastical creations of a demoralized intellect, can never guide men to civil freedom; but will, by an inevitable necessity, fix upon nations the fetters of a civil or military despotism: for any government is better than the mock freedom of vanity and folly and lawless violence. Had the nations of the Continent learnt and practised the humbling lessons of the Gospel, they would have known what rational liberty meant, and they might have secured it for their children. But each man has had his own nostrum;

and each man hates all nostrums but his own. Thus is folly rampant while charity is in bondage; and the Pantheist, the Socialist, the Despot, and the Republican, have their several cures for every civil and religious malady; while they forget that the heart of man is the fountain-head of all moral evil. Let that be purified by a benevolent and heaven-informed teaching, which may reach the innermost springs of human thought, and make mankind obedient to the lessons of wisdom and truth and purity and love: and when thus informed, men will be fit for civil freedom, and under the will of Providence, they may gain an enduring possession of it.

Once for all—the prospects of the University, so far as regards the future, are obscured by the clouds which now seem to be gathering about the Country: but if we have some cause for fear, we have good cause (if we be true to ourselves) for thankfulness and hope; and our only security is in the righteous performance of the great trust that Providence has committed to us. Cambridge is not a mere school of material science: for material science teaches us not our religious and social duties, and may lead us into a proud indifference to the moral interests of our fellow-men—into scepticism—or into material Pantheism, which is the basest form of infidelity. Cambridge is not a mere school of experimental or mechanical discoveries: for mechanical inventions have sometimes, through the cold-heartedness and selfishness of men, become the powerful instruments of moral evil. Cambridge is not a mere school of the imagination, and of the refinements and luxuries and decorations of human learning: for these things, however good and beautiful and useful as the accessories of more solid learning, may become the most dangerous ministers of a moral poison. She is not a mere dogmatic teacher of the National Religion: for religion, without moral, social, and physical knowledge, will lead us, almost of necessity, into one-sided and narrow views of religious truth, false estimates of ourselves, bigotry, and intolerance; and into disloyalty to the State, should the State possess the true elements of civil freedom: and, worst of all, such a religion will sometimes lead men to sacrifice the sacred principles of candour, charity, and truth, to the supposed interests of a party. These are no ideal evils; they are still rampant in society: and past history tells us, that crimes, which have been the shame and dishonour of humanity, have again and again been perpetrated in the sacred name of the religion of Jesus.

But the teaching of the University of Cambridge has not been that of a bigoted and narrow school: and we earnestly hope that she will shew in times to come that exalted Catholicity, *which gives to faith what belongs to faith, while it gives to reason what belongs to reason*—which honours truth under whatsoever form, moral or material,—which tells us that our apprehension of truth is an apprehension of a part of the attributes and will of God, and that all truths are knit together in inseparable unity, and have their everlasting seat within His bosom. If this continue to be her faith, she will think it her greatest privilege to be the honoured channel of conveying the widest lessons of truth to the children of the State; and this she will do zealously, and not grudgingly: and little will she have to fear from new fashions of study or revolutions of opinion; for her interests will be blended with the best interests of learning and humanity and charity and religion: and the State will honour her as the blessed instrument, under Providence, of conveying to its sons their first and best lessons of wisdom and science, of faith, moral purity, and brotherly love[*].

---

[*] Some apology is due to the University for a very long delay in the publication of the following Discourse, which has been advertised, for two or three years, as almost ready for the Press. The following statement is my apology. Sometime in the year 1846 the proprietors of the Discourse told me that they wished to publish a new Edition of it, and asked me to give them an additional Preface. I told them that I could not find time to comply with their request before the end of the autumnal Term of that year. The Discourse was afterwards passed through the Press; and during the early months of 1847 the Appendix was printed with one or two additional Notes; and the early, geological part of the Preface was then written very nearly as it now appears. I hoped, indeed, that the work would be published at the beginning of the Easter Term of 1847; in which case the Preface would not have extended to so much as one half its present length. But an attack of a chronic malady, which for years back has made me a very unproductive labourer, drove me from Cambridge before my task was done; and I had no power of taking it up again during the remainder of that year. In the early spring of 1848 I resumed my

task; but I was again compelled, by ill health, to give it up before I had made any good advance in it; and other subjects then pressed on my notice which I did not wish to pass over, and which greatly extended my first plan. The Preface, in its present more expanded form, was finished during the spring of this year: but professional engagements called me away from Cambridge for two months; and I was afterwards so crippled by a severe accident as to be incapacitated from either bodily or intellectual labour for two months more. The revision of the latter part of the Preface, and its passage through the Press, was, therefore, necessarily postponed to the latter part of the Long Vacation; and a considerable part of it has been printed during the present busy Academic Term. A few additions have been made to it (such *e.g.* as a short reference to the Logic of Mr Stuart Mill, and to some papers on the Hegelian Philosophy, by the Master of Trinity College) while the sheets were in the Press, which require, perhaps, no formal notice[*]: and I hardly need remark, that most of the foot-notes were also added while the several sheets were passing through the Press. In other respects it has been printed, almost word for word, as it was first written. Its great length gives an incongruity to its Title—"a Preface:" but for this there is now no help; and the publishers and readers will have little cause to complain of this incongruity in form, if the matter of the Preface be thought good and useful.

TRINITY COLLEGE,
Nov. 30, 1849.

---

[*] *Supra*, p. ccxlvii.

CORRIGENDA, &c.

TRIN. COLL. *September* 10, 1850.

On reperusing some pages of the Supplement to the Appendix I am compelled to make the following additions and corrections:

p. 180, last line, *for* axis *read* equator.
p. 210, l. 22, *for* this extract *read* this passage of the *Explanations*.
p. 213, l. 25, *for* infra *read* supra.
p. 263, last line, *for* hundred of miles *read* hundred miles.
p. 264, l. 8, *for* the known parts *read* the best known parts.[*]
p. 289, l. 4 from the bottom, *for* first sentence belongs *read* two first sentences belong.
p. 306, l. 11, *for* stil *read* still.
p. 314. After the heading of Note X. add (p. cccxxxii.)

[*] In p. 264 I have asserted "that New Holland, as a country of dry land, is one of the oldest on the face of the earth;" but the evidence on which this conclusion rests is drawn exclusively from a part only of the Eastern chain of the Australian continent, and may not seem to warrant so broad a conclusion. I will, therefore, give the evidence somewhat more in detail.

(1) A great mountain-chain, commencing in Tasmania, runs along nearly the whole eastern coast of New Holland. The best explored parts of this chain are of the palæozoic period; and no oolitic, cretaceous, or older tertiary rocks, are associated with it, or elevated on its flanks. Near its southern limits, and along its western flanks, there are however tertiary deposits, apparently of the pliocene age and always in a horizontal position and at a low level. We therefore conclude, that the greater part of this chain was elevated about the end of the palæozoic period, and has continued as dry land ever since with a comparatively small change of level. The same conclusion, based on the same kind of evidence, may be applied to two other chains—one in South Australia, the other in Western Australia: and there are indications of a chain existing also in the northern part of North Australia under the same geological conditions. (2) Tertiary deposits, apparently of the same pliocene age and in the same horizontal position, fill very wide spaces along the shores of Southern, Western, and (probably also) of Northern Australia; and it is almost certain that the same deposits are widely spread over the low central deserts of the

CORRIGENDA, &c.

Australian continent. For a proof of these assertions I must refer the reader to an excellent and condensed *Sketch of the Physical Structure of Australia*, published during this year by Mr Jukes; in which all the scattered information bearing on his subject is combined with good observations, made by himself, on many parts of the Australian coast. (3) The present Australian flora and fauna must, therefore, have spread over the continent, from the several old elevated chains above mentioned, till they were arrested in the great arid tertiary deserts by conditions unfavourable to animal and vegetable life. Conditions, far more than time, appear to have determined the specific character and distribution of this southern flora and fauna. As to their antiquity, Mr Jukes seems to lean to the opinion first, I believe, advanced by Cuvier, and alluded to above (p. 263). This is, however, a question I wish not now to discuss: but the facts, above stated, do at least prove the utter futility of arguing, that the flora and fauna of New Holland are new and imperfectly developed, because the parts of Australia, from which animal and vegetable life have sprung, belong to a country that has risen out of the sea at a recent period.

DISCOURSE.

A
DISCOURSE,
&c.

Psalm CXVI. 17, 18, 19.

I will offer to thee the sacrifice of thanksgiving, and will call upon the name of the Lord. I will pay my vows unto the Lord now in the presence of all his people, In the courts of the Lord's house, in the midst of thee, O Jerusalem. Praise ye the Lord.

How beautiful and how varied are the forms of praise and thanksgiving in the book of Psalms! They appear as the outpourings of a grateful heart before God for the glories of his creation—for succour in the hour of danger—for deliverance from affliction—for national privileges—and for anticipated salvation. There is an earnestness in many of them that lays hold upon our strongest sympathies: for (without speaking of their inspired and prophetic character) they may be truly said to spring from feelings which are natural to every man who is not utterly debased, and in the exercise of which generous tempers ever take delight. The words I have chosen are the conclusion of a Psalm composed by one who had been raised up from some great affliction—*his soul had been delivered from death, his eyes from tears, and his* *feet from falling.* I quote them however with no reference to the purpose for which they were first uttered, but because they are well fitted for the occasion that brings us together—to *offer in the courts of the Lord's house the sacrifice of thanksgiving, and to call upon the name of the Lord.*

A well disciplined mind may perhaps learn to see everything with an eye of faith, so as to find, in all the dispensations of Providence, a motive for the exercise of holiness. But many of us are, I fear, too little endowed with a spirit leading to a contemplation of God in the common bounties of his creation: our spiritual sluggishness requires something more exciting than sensations arising from large and general views of God's providence—something which comes immediately to our own hearts and bosoms, and seems to bear upon our personal happiness. When the body is weighed down by sickness, or the spirits sunk by present affliction, the glories of this world fade away before us ; and we seek, or at least as Christian men we ought to seek, our proper consolation in looking to that heavenly kingdom which suffers no change, and into which sorrow finds no entrance: and after the clouds lately gathered round us are passed away and we are conscious of a great deliverance, the feelings of our hearts (unless quite dead to religious sense) will burst forth in the language of praise and thanksgiving. In like manner, though perhaps in less degree, on the national anniversary, the religious festival, or the solemn commemoration, thoughts seemingly extinct within us will start into new life, and trains of association will arise, lifting our thoughts above the selfishness and sensuality of the world, and fixing them on our noblest destinies.

And let me here observe, that the fact of our receiving impressions like these (however interrupted, and by whatever means excited,) is an evidence that the spirit of religion is not dead within us. By the blessing of God, the spark now burning but dimly may be excited to a flame, which shall refine the corruptions of our hearts and become the animating principle of our lives. On this account, every visitation tending to alienate our affections from the world ought to be considered as the warning voice of God addressed to ourselves, and not to be despised; and every solemnity of religion (whether public or private), having the power of touching the heart and acting on our better feelings, is to be regarded as a merciful invitation of God, and never, as we hope for heaven, to be rejected.

Sentiments such as these are surely fitted for the occasion on which we meet; to return thanks to God for the mercies he has vouchsafed to us—to recount the names of those pious benefactors to whom we owe the peaceful abode of learning and science wherein we dwell—to place before the mind's eye those illustrious men who have inhabited this our Zion, and obtained for themselves a name imperishable as the records of our race. These men are to us in the place of a glorious ancestry, urging us by their example to an emulation of their deeds; and we are unworthy sons if we turn a deaf ear to that voice by which they still seem to speak to us.

Among them were found many to join the foremost rank of those who in ancient times emancipated this country from spiritual bondage; to partake in the great work of translating the records of our faith into our native tongue, and to put forth their whole intellectual strength in diffusing the light of Christian truth among the people. In their lists we read the name of Bacon, who, gifted almost with prophetic spirit, was enabled to climb the Pisgah of science, and point out the land of promise to those who were to follow him—of Newton, who after having achieved, by his single arm, the conquest of the natural world, was not puffed up, but gave God the glory; combining, with powers which never fell to the share of any other man, the simplicity of a child, and the humility of a Christian—of Ray, who saw the finger of God in the whole frame-work of animated nature, and within these sacred walls taught the listeners to comprehend the meaning of those characters he himself had first interpreted—of Barrow, the learned and the wise, the inventive philosopher, the manly reasoner, the champion of England's faith, the eloquent and single-minded Christian moralist—and of many other illustrious men, whose very names time would fail me to tell, who having had their minds braced by the studies of this place, and their hearts sanctified by the wisdom from above, devoted themselves to the high and holy office of extending the empire of truth.

And surely the happiness we enjoy, and the names we this day commemorate, require something more from us than the gratitude of the lips—something more than a formal and heartless ceremonial. We are here met at our annual celebration where these mighty men have met before; we are worshipping at the altar where they worshipped, we are treading on their ashes, and looking on their tombs, and every thing around us is sanctified by their genius.

Circumstances like these have ever exerted a powerful influence on generous natures. If heathen men have felt them, and made them the topics of exhortation and the mainsprings of national honour, how much more ought they to effect us who are assembled as a Christian brotherhood. We believe that the glorious names we commemorate are not those of men who have perished without hope; but, having fought the good fight in this life, that they have received a crown of glory in the life which is to come. They seem to speak to us from their tombs, but with no earthly voice, encouraging us by their example, and telling us to be firm and of good cheer in this our pilgrimage—that beyond the dark portal to which we all are hurrying there is a land of promise—and that treading in the steps where they have trodden, and guided by the heavenly hand which guided them, we ourselves may reach that land and dwell with them in everlasting glory.

The influence of domestic example is, I think, to be recognized in the institutions of every nation. In all of them, under some form or other, we find the traces of hereditary rank and of transmitted authority: and in infant societies, those institutions did not, I believe, commence in assumed physical superiority, but rather in the experience of moral fitness.

It is not wise for us too nicely to canvass the decrees of Omnipotence: some of them we can partially comprehend—some of them must ever remain hidden from our sight. We are however justified in saying that, in the moral, as in the physical world, God seems to govern by general laws: and when he declares to us, that he will visit the sins of the fathers on their children; and that he will have mercy on thousands in them that love him and obey him; we hear not a new and despotic annunciation contrary to the ordinary operations of his moral government; but rather we hear a formal promulgation and a higher sanction of them. It is true as a matter of fact, that some races and kindreds are favoured above the rest of men—that God shews mercy to them in thousands, spreading among them the light of truth, and exalting them above the other nations of the earth. But these temporal blessings, I repeat, are not violations, but examples of the moral government of God; for in the nature of things they only co-exist with the exercise of those moral and intellectual qualities which bind men and families together, and form the very sinews of national strength. When the lessons and the examples of virtue fail, the nation's strength fails with them; the voice of eloquence and the maxims of wisdom are no longer heard within its walls, and its proudest monuments soon moulder into the dust; or if they remain at all, are visited in after times as mighty ruins, serving only to contrast its former glory with its present desolation.

It is then our bounden duty to reflect, that our sentiments and our conduct do not terminate with ourselves. Every man, however humble his station and feeble his powers, exercises some influence on those who are about him for good or for evil: and these influences emanating again as from a fresh center, are propagated onwards—and though diluted by new motives, and modified by new circumstances at each transmission, so as in common cases to be lost to the eye of man, they may still go on producing a silent effect to the remotest generations; and thus become, under Providence, a part of the appointed means by which a nation's glory is continued, and its strength upheld.

What I have said of nations, is true also of families or households like our own. If we have received a goodly inheritance we ought to transmit it unimpaired to our children. It matters not to us that the light of truth has been shed abroad by those who have gone before us, if we be living in intellectual darkness. It is not our honour, but our shame, that the wise and good have dwelt within these walls, if they have now no living representatives. Self-examination is therefore among the most important duties of this solemnity: nor is it to be a mere idle and inoperative retrospect, but must be followed by prayer against intellectual pride and presumptuous sins—prayer for support in those resolves of which our consciences approve—prayer above all for that spirit which will lift us above the temptations of the world. If we be endowed with this temper, we bring a hallowed offering to the altar, and cannot doubt that the incense of our praise will mount up to the throne of grace, and bring down a blessing on our household.

By the arrangements of Providence, things which to us seem good and evil are so blended in this life, that in the annual celebration of societies like our own, we are seldom permitted to meet with feelings of unmixed joy. In thinking of the past glories of our body and of the mighty minds by which its animation has been continued, it is impossible for any one who has dwelt within its walls but a few short years, not to be struck with the changes in its moral aspect—not to be reminded of early prospects blighted, of the links of friendship severed—not to have impressed upon his memory, that hearts but as yesterday warm with kindness, and tongues glowing with the accents of genius, are now cold and inanimate. The song of praise and the voice of thanksgiving ought therefore to be heard as notes of preparation; telling us that this is not our abiding city—that with all the good things it contains, and the goodly recollections belonging to it, it is but a halting-place in the great pilgrimage of life—and that before another returning festival, the names of some of us may be also written on the long scroll of those who are departed.

These, my brethren, seem to be sentiments not merely fitted for the occasion on which we meet, but such as must force themselves on every serious and reflecting mind. I must however content myself with this short allusion to them, as the time does not allow me to dwell on them any farther.

Leaving then these general topics, I proceed to speak of this as a place of sound learning and Christian education, and to inquire what ought to be the conduct of the understanding during the course of our academic studies before we enter on the great theatre of life. What I am now saying, though I hope not altogether unfitting to other ears, is chiefly addressed to the younger members of our household.

In the first place, let me put before you a law and condition of your being, of great influence in the formation of your characters. Impressions independent of the will, whether produced directly through the senses, or by trains of association within the mind, gradually lose their power by repetition; but habits, whether of mind or body depending on a previous determination of the will, gain strength by their very exercise, so as at length to become a part of ourselves and an element of our happiness.

It is to the operation of this law that we must refer some of the strangest contradictions in human nature. What a melancholy contrast we too often find between the generous temper of youth, and the cold calculating spirit of a later period! between the actions of a man at one time of his life and those of another! I believe there is not one whom I am now addressing, who, if he reflect at all, will not acknowledge how much the cold hand of time has already chilled some of his better feelings. Now it is absolutely certain, that sensuality and other sins to which by nature man is prone, will do their work in marring the image of God; and, unless opposed by some countervailing principle, will end in habits making a wreck both of soul and body. In such a state of things a man becomes utterly spell-bound—he is in *the gall of bitterness and the bond of iniquity*, and has no power to help himself; and the hand of God alone can help him.

I am not now contending for the doctrine of moral necessity; but I do affirm that the moral government of God is by general laws; and that it is our bounden duty to study those laws, and as far as we can to turn them to our account. As far, at least, as this world is concerned, the feelings on which we act in early life may and do diminish in their intensity, and yet we may go on in a course, honourable to ourselves and useful to our country, mainly by what is called the force of habit. Of what vast importance is it then, to those I am now addressing, many of whom have barely reached the dawn of manhood, to lay a good foundation against the coming time, by fostering habits of practical kindness, and self-control—by mental discipline and study—by cultivating all those qualities which give elevation to the moral and intellectual character—in one word, by not wavering between right and wrong, but by learning the great lesson of acting strenuously and unhesitatingly on the light of conscience.

The studies of this place, so far as they relate to mere human learning, divide themselves into three branches.

1st. The study of the laws of nature, comprehending all parts of inductive material philosophy.

2dly. The study of ancient literature—or in other words, of those authentic records which convey to us an account of the feelings, the sentiments, and the actions, of men prominent in the history of the most famous empires of the ancient world. In these works we seek for examples and maxims of prudence and models of taste.

3dly. The study of ourselves, considered as individuals and as social beings. Under this head are included ethics, and metaphysics, moral and political philosophy, and some other kindred subjects of great complexity, hardly touched on in our academic system, and to be followed out in the more mature labours of after life. Our duty here is to secure a good foundation on which to build; and to this end we must inquire what ought to be the conduct of the mind in entering on any of these great provinces of human learning.

I. A study of the laws of nature for many years has been, and I hope ever will be, held up to honour in this venerable seat of the discoveries of Newton. But in this, as in every other field of labour, no man can put aside the curse pronounced on him—

that by the sweat of his brow he shall reap his harvest. Before he can reach that elevation from whence he may look down upon and comprehend the mysteries of the natural world, his way is steep and toilsome, and he must read the records of creation in a strange, and to many minds, a repulsive language, which, rejecting both the senses and the imagination, speaks only to the understanding. But when this language is once learnt, it becomes a mighty instrument of thought, teaching us to link together the phenomena of past and future times; and gives the mind a domination over many parts of the material world, by teaching it to comprehend the laws by which the actions of material things are governed. To follow in this track, first trodden by the immortal Newton—to study this language of pure unmixed truth, is to be regarded not only as your duty, but your high privilege. It is no servile task, no ungenerous labour. The laws by which God has thought good to govern the universe are surely subjects of lofty contemplation; and the study of that symbolical language by which alone these laws can be fully deciphered, is well deserving of your noblest efforts. Studies of this kind not merely contain their own intellectual reward, but give the mind a habit of abstraction, most difficult to acquire by ordinary means, and a power of concentration of inestimable value in the business of life. Were there any doubt of this, I would appeal to modern examples, and point out a long list of illustrious men, who, after being strengthened by our severe studies and trained in our discipline, have borne off the prize in the intellectual conflicts of their country. But I need not attempt to prove what no one is prepared to deny.

Are there, however, no other consequences of these studies beyond those I have pointed to? The moral capacities of man must not be left out of account in any part of intellectual discipline. Now these severe studies are on the whole favourable to self-control: for, without fastening on the mind through the passions and the senses, they give it not merely a power of concentration, but save it from the languor and misery arising from vacuity of thought—the origin of perhaps half the vices of our nature.

Again, the study of the higher sciences is well suited to keep down a spirit of arrogance and intellectual pride: for, in disentangling the phenomena of the material world, we encounter things which hourly tell us of the feebleness of our powers, and material combinations so infinitely beyond the reach of any intellectual analysis as to convince us at once of the narrow limitation of our faculties. In the power of grasping abstract truth, and in the power of linking together remote truths by chains of abstract reasoning, we *may* be distinguished from the lower orders of the beings placed around us; but, in the exercise of these powers, we bear perhaps no resemblance whatsoever to the supreme intellect. Applied to an Almighty Being with the attribute of ubiquity, in whose mind all things past and to come co-exist in eternal presence, time and space have no meaning, at least in that sense in which they are conditions of our own thoughts and actions. To him all truth is as by intuition; by us truth is only apprehended through the slow and toilsome process of comparison. So that the powers and capacities, forming the very implements of our strength, are also the indications of our weakness. In some of our capacities, we may perhaps exhibit a faint shadow of a portion of our Maker's image; but in the reasoning power, of which we sometimes vainly boast, we bear to him, I believe, no resemblance whatsoever.

Simplicity of character, humility, and love of truth, ought therefore to be (and I believe generally have been) among the attributes of minds well trained in our philosophy. After all that has been done since the thoughts of man were first turned to the phenomena of the material world—after all the boasted discoveries of science, from the first records of civilization down to our own days—those glorious passages of the Old Testament, contrasting the power and wisdom of God in the wonders of his creation, with man's impotence and ignorance, have still, and ever will continue to have, not merely a figurative or poetical, but a literal application. *Gird up now thy loins like a man: for I will demand of thee, and answer thou me*[*]. *Where wast thou when I laid the foundations of the earth? declare, if thou hast understanding... Whereupon are the foundations thereof fastened? or who laid the corner-stone thereof; when the morning-stars sang together, and all the sons of God shouted for joy? Or who shut up the sea with doors, when it brake forth, as if it had issued out of the womb? When I made the cloud the garment thereof, and thick darkness a swaddling-band for it...and said, Hitherto thou shalt come, but no further: and here shall thy proud waves be stayed?... Where is the way where light dwelleth? and as for darkness, where is the place thereof?...Knowest thou it, because thou wast then born? or because the number of thy days is great?*

[*] Job, chap. xxxviii.

Before such an interrogator we can only bow in humble adoration. The study of the laws of nature may strengthen and exalt the intellectual powers: but strange must be our condition of self-government and tortuous our habits of thought, if such studies be allowed to co-exist with self-love and arrogance and intellectual pride.

A study of the Newtonian philosophy, as affecting our moral powers and capacities (the subject I am now pressing on your thoughts), does not terminate in mere negations. It teaches us to see the finger of God in all things animate and inanimate, and gives us an exalted conception of his attributes, placing before us the clearest proof of their reality; and so prepares, or ought to prepare, the mind for the reception of that higher illumination, which brings the rebellious faculties into obedience to the divine will.

We learn, by experiment, the different actions and relations of the material things around us, and we find them bound together by a law of mutual attraction. Following our master of philosophy in the loftiest generalization recorded in the history of mankind, we attribute this property, found in the matter on the surface of our planet, to every other mass of matter within the limits of the visible universe. We bring our generalization to the test of observations of a new and certain kind, and we find that it is true. We find that no parts of the visible universe are insulated from the rest; but that all are knit together by the operation of a law common to them all. We follow this law into its remotest consequences, and we find it terminating in beauty, and harmony, and order*.

---

* See Appendix, Note (A).

Again, if we commence our examination of the natural world with the small portions of matter which surround us, and following our induction in a new direction, resolve them into their elements, and unravel the laws of their combination; we see at every step new cause for wonder—new objects for admiration. Every portion of the matter we tread beneath our feet (however insignificant as an object of sense) propagates its influence through all space, and is felt in the remotest regions of the universe. However small the particle of dust we trample on, it may present traces of a mechanism subservient to the complicated functions of a living being; or it may be a compound inorganic body, possessing properties of indefinite complexity: and though it be what we call a simple substance, still it is held together by its own laws of cohesion; it is composed of elements not brought together fortuitously, but in obedience to a fixed law, by which they are congregated in definite proportions, and grouped in symmetry and order. Not only is every portion of matter governed by its own laws, but its powers of action on other material things are governed also by laws subordinate to those by which its parts are held together. So that in the countless changes of material things and their countless actions on each other, we find no effects which jar with the mechanism of nature; but all are the harmonius results of dominant laws.

Again, if we pass from the consideration of things visible and tangible to the subtile and imponderable agents of the material world, we not only witness the manifestation of their powers in every physical change and every combination; but we know that some of them, and we may perhaps suppose that all of them, are diffused uninterruptedly through every portion of the universe. We are certain that the material of light is at least as far extended as the force of gravitation. It places us at once in physical contact with the remotest bodies of our created system, and by its vibrations they become manifest to us through our visual sense. There is, therefore, no portion of space, however small or however distant, which is not filled at all times with subtile matter—which does not every moment transmit material influences, in number complexity and rapidity beyond the grasp of thought; yet never anomalous or fortuitous, but governed by fixed laws, and subservient to ends most important in the economy of nature, and essential to the very existence of sentient beings.

In speaking of the laws of nature and of the harmonious changes resulting from their action, in spite of ourselves we fall into language in which we describe the operations of intelligence: and language, let me observe, was never formed by a convention of learned men, or constructed on the scheme of an hypothesis. It is the true offspring of our intellectual nature, and bears the image of such ideas as rise up of necessity in the mind, from our relation to the things around us. If we forget him in our thoughts, with our lips at least we must do homage to the God of nature. What are the laws of nature but the manifestations of his wisdom? What are material actions but manifestations of his power? Indications of his wisdom and his power co-exist with every portion of the universe. They are seen in the great luminaries of heaven—they are seen in the dead matter whereon we trample—they are found in all parts of space, remote as well as near, which we in our ignorance sometimes regard as mere vacuities—they are unceasing—they are unchangeable*.

Contemplations such as these lift the soul to a perception of some of the attributes of God; imperfect it may be, but still suited to the condition of our being. But are thoughts like these to pass through the mind, and produce only a cold acquiescence? Are we to dwell in the perpetual presence of God and yet dishonour him by the worship of ourselves, and refuse to him the homage of our humble praise? Such were not the feelings of the holy psalmist, when, contrasting his own feebleness with the all-pervading wisdom and power of God, he was kindled as by fire from heaven, and burst out into rapturous expressions of adoration: *Whither shall I go from thy spirit? or whither shall I flee from thy presence? If I ascend up into heaven, thou art there: if I make my bed in hell, behold, thou art there. If I take the wings of the morning, and dwell in the uttermost parts of the sea; even there shall thy hand lead me, and thy right hand shall hold me. If I say, Surely the darkness shall cover me; even the night shall be light about me. Yea, the darkness hideth not from thee: but the night shineth as the day: the darkness and the light are both alike to thee*†.

How any believer can deny the reality of a natural religion when he reads those passages in the Bible where its power is so emphatically acknowledged, is more than I can understand. We are told by St. Paul, that even the Gentiles are without excuse; *for the invisible things of God from the creation of the world are clearly seen, being understood by the*

---

* See Appendix, Note (B).

† Psalm cxxxix. 7—12.

*things which are made, even his eternal power and Godhead**. Yet I have myself heard it asserted within these very walls, that there is no religion of nature, and that we have no knowledge of the attributes of God or even of his existence, independently of revelation. The assertion is, I think, mischievous, because I believe it untrue: and by truth only can a God of truth be honoured, and the cause of true religion be served.

But there is another class of objectors, who not only adopt this cold and unnatural conclusion, but rejecting revelation along with it, banish utterly all thought of God from the world. It is indeed true, as these objectors state, that all material changes are governed by fixed laws, and that the present condition of all material things is but a natural consequence of these laws operating on that condition of matter which preceded the phenomena we contemplate. They rest their strength, so far as I understand their meaning, in this immutability of the laws of nature: and having, with much labour, deciphered a portion of these laws, and having traced the ordained movements of the material world without ever thinking of the Being by whom these movements were directed, they come at length to deify the elements themselves, and to thrust the God of nature from his throne. But where is the reasonableness of this conclusion? The unchangeableness of the laws of nature is not only essential to the well being, but to the very existence of creatures like ourselves. The works of our hands are liable to perpetual change, from caprice, from violence, or from natural decay: but in the material laws ordained by God, there is no semblance of decay, because they partake of the perfections of his attributes. and are therefore unchangeable.

---

* Rom. i. 20.

The single-minded writers of the New Testament, having their souls filled with other truths, thought little of the laws of nature: but they tell us of the immutable perfections of our heavenly Father, and describe him as a being in *whom is no variableness or shadow of turning*. The religion of nature and the religion of the Bible are therefore in beautiful accordance; and the indications of the Godhead offered by the one, are well fitted to give us a livelier belief in the promises of the other. So far from offering any foundation for an atheistical argument, the constancy of the laws of nature might, I think, have been almost anticipated by a well ordered mind, though unacquainted with the great discoveries of physics: and should the framer of the universe have other changes in reserve for the material world beyond those that follow from the laws by which he has already in part revealed himself to us, we have no right to suppose that such changes can be known or understood by beings like ourselves—so feeble in capacity—so limited in time—and confined to such a speck of the universe.

But after all, we do contemplate something more than a mere succession of material changes. We find that these changes are limited by an adjusting power, and tend to a condition of equilibrium, and that the ultimate results of the laws of nature are harmony and order. We find them operating in different portions of space with endless complexity, and yet producing effects perfectly adapted to each other. We see innumerable portions of matter not only obeying laws common to all matter, but acted on by new laws subservient to vital power; and by these laws gradually moulded into a beautiful form and mechanism—suited at once to all the complicated functions of a sentient being, and to all the material elements which surround it. Are we to believe that there can be such beautiful and harmonious movements in the vast mechanism of nature, and yet think that the Spirit of God hath not brooded over them, and that his hand hath not guided them? Can we see in every portion of the visible world the impress of wisdom and power, and yet believe that these things were not foreseen in the Divine mind, and these ends not contemplated before he called the universe into being?

The external world proves to us the being of a God in two ways; by addressing the imagination, and by informing the reason. It speaks to our imaginative and poetic feelings, and they are as much a part of ourselves as our limbs and our organs of sense. Music has no charms for the deaf, nor has painting for the blind; and all the touching sentiments and splendid imagery borrowed by the poet from the world without, would lose their magic power, and might as well be presented to a cold statue as to a man, were there no pre-ordained harmony between his mind and the material things around him. It is certain that the glories of the external world are so fitted to our imaginative powers as to give them a perception of the Godhead, and a glimpse of his attributes; and this adaptation is a proof of the existence of God, of the same kind (but of greater or less power according to the constitution of our individual minds) with that we derive from the adaptation of our senses to the constitution of the material world.

The heavens declare the glory of God, and the firmament sheweth his handy-work[*]. Here is a direct assertion—an appeal to the heart and not to the understanding; and every unsophisticated heart will beat in unison with it. *The fool hath said in his heart, There is no God: corrupt are they, and have done abominable iniquity*[†]. In this passage the denial of God is coupled in the mind of the sacred poet with foul and sensual sin. And is not such a union justified by experience? A soul corroded by sensual sin can ill reflect the pure image of God—can ill discern the indications of his will in the glories of his creation.

Leaving, however, the proofs of an intelligent cause from the connexion between the external world and our imaginative powers, let us once more glance our eye over the proofs which appeal to the reasoning faculties. The mind becomes bewildered among the countless movements continually going on, and the perpetual changes produced by material actions, of which we see neither the beginning nor the end: but we find repose in the study of animated nature. Every being possessing life may first be considered apart from the rest of nature. Its bodily organs are produced by powers of vast complexity, and understood only in their effects—confined in their operation to the individual being, and entirely separate from the ordinary modes of atomic action. Yet these organs thus elaborated, exhibit throughout a perfect mechanism, in all its parts (as far as we can comprehend them) exactly fitted to the vital functions of the being. Contrivance proves design: in every organic being we survey (and how countless are the forms and functions of such beings!) we see a new instance of contrivance and a new manifestation of an intelligent superintending power.

---

[*] Psalm xix. 1.

[†] Psalm LIII. 1.

This proof is so strong that it never has been and never can be gainsaid. It is in vain that we attempt to shut out the belief of an intelligent Creator by referring all phenomena to a connected succession of material causes, not one of which is fully comprehended. This thought should indeed fill us with deep humility, but takes not from us the fair inductions of our reason. We do not understand that complicated material action by which the God of nature builds up the organic structure of a sentient being: but we do, in part at least, comprehend the adaptation of its mechanism to various ends, and we see those ends accomplished: and this enough to warrant our conclusion.

An uninstructed man sees a piece of mechanism, and from the form and the acting of its external parts (though he comprehend neither its whole structure nor its objects) is certain that it is the work of a skilful hand. Another man understands all its complicated movements, but knows not the nature of the moving power in which they originate. A third can explain the alternate expansions and condensations of an elastic vapour, and point out this action as the origin and support of the whole propelling force. At length we find one, who will not only explain the whole mechanism from first to last; but tell us of the nature of its materials, of the places whence they were derived, of the modes of their fabrication, of the manner in which they were put together, and of all the effects of their combined action. But it is not necessary to know all this to be certain of an intelligent contriver. The first observer drew this conclusion rightly from what he saw, though he comprehended little of these complicated movements. And after all, what relation does the most skilful mechanist bear to his own workmanship? He does not create one particle of matter—he does not supersede one law of nature: but using the matter created to his hands, and forming and combining it in subordination to the laws impressed on it, he produces a connected succession of material actions, and obtains a series of results—foreseen in his own mind and determined in his will before he commenced the building of his fabric.

Something like this we can trace in the developement of organic beings. They are formed of matter, which was created. and governed by its own laws, anterior to their existence: they are matured by a regulated succession of material actions: when perfected, they exhibit an exquisite combination of mechanical contrivances, and organs fitted to carry them into effect. To such a structure are superadded vital functions and appetencies, which (like the moving force of a complicated engine) put all its parts into motion, and compel them to obey the laws of their destination. The external forms of organic bodies we can study. their functions we can observe, their internal mechanism we can partly trace: but when we consider the vital powers connected with their origin and developement. we find ourselves among phenomena out of the ken of our senses, and removed beyond our intellectual grasp; and are compelled to acknowledge our utter ignorance. But, on this account to exclude an intelligent contriver, would not be more wise, than for a man to assert the fortuitous concourse of the wheels of a machine, because he knew not the power by which it was set in motion.

It is in vain that we attempt to banish an intelligent Creator, by referring all changes, organic and inorganic, to a succession of constant material actions, continued during an eternity of past time. Were this true, it would not touch our argument: and every clear instance of organic contrivance or material adaptation, would be a phenomenon unexplained, except on the supposition of a contriver. It would only prove that, in a certain portion of space, God had thought fit to give a constant manifestation of his wisdom and power through an indefinite period of duration. The eternity of material forms is, however, but a dream of false philosophy, unfounded in reason or analogy; and, so far at least as organic nature is concerned, contradicted by the plainest physical records of the past world.

Assuming, then, that the structure of every being, endowed with life, demonstrates the existence of an intelligent overruling power, to what more does the conclusion lead us?—To the inevitable belief that all inanimate nature is also the production of the same overruling intelligence. As all parts of matter are bound together by fixed and immutable laws; so all parts of organic nature are bound to the rest of the universe, by the relations of their organs to the world without them. If the beautiful structure of organic bodies proves design, still more impressive is the proof, when we mark the adaptation of their organs to the condition of the material world. By this adaptation we link together all nature, animate and inanimate, and prove it to be one harmonious whole, produced by one dominant intelligence.

The organs of sense and the materials around them are related to each other in the way of adaptation, but not in the way of cause and effect. The eye is not formed by the vibrations of light, nor the ear by the pulsations of the air. Had this been the case, such beings as the blind and the deaf would never have been heard of; for no being can be removed from the influence of those elements. The eye and the ear are formed in the womb by the mysterious operations of organic secretion and assimilation, before the pulsations of the air have ever reached the ear, or the vibrations of light have ever acted on the visual sense. They are examples of a beautiful mechanism demonstrating design; but they are adapted only to a future condition of the being; and so also demonstrate a provident intelligence. Should any one deny conclusions such as these, I can only reply that his mind is differently constituted from my own, and that we have no common ground on which to build a reasonable argument.

By the discoveries of a new science (the very name of which has been but a few years engrafted on our language), we learn that the manifestations of God's power on the earth have not been limited to the few thousand years of man's existence. The Geologist tells us, by the clearest interpretation of the phenomena which his labours have brought to light, that our globe has been subject to vast physical revolutions. He counts his time not by celestial cycles, but by an index he has found in the solid framework of the globe itself. He sees a long succession of monuments each of which may have required a thousand ages for its elaboration. He arranges them in chronological order; observes on them the marks of skill and wisdom, and finds within them the tombs of the ancient inhabitants of the earth. He finds strange and unlooked-for changes in the forms and fashions of organic life during each of the long periods he thus contemplates. He traces these changes backwards through each successive era, till he reaches a time when the monuments lose all symmetry, and the types of organic life are no longer seen. He has then entered on the dark age of nature's history; and he closes the old chapter of her records.—This account has so much of what is exactly true, that it hardly deserves the name of figurative description.

Geology, like every other science when well interpreted, lends its aid to natural religion. It tells us, out of its own records, that man has been but a few years a dweller on the earth; for the traces of himself and of his works are confined to the last monuments of its history. Independently of every written testimony, we therefore prove by natural evidence that man, with all his powers and appetencies, his marvellous structure and his fitness for the world around him, was called into being within a few thousand years of the days in which we live—not by a transmutation of species, (a theory no better than a phrensied dream), but by a provident contriving power. And thus we at once remove a stumbling block, thrown in our way by those who would rid themselves of a prescient first cause, by trying to resolve all phenomena into a succession of constant material actions, ascending into an eternity of past time.

But this is not the only way in which Geology gives its aid to natural religion It proves that a pervading intelligent principle has manifested its power during times long anterior to the records of our existence It adds to the great cumulative argument derived from the forms of animated nature, by shewing us new and unlooked-for instances of organic structure adjusted to an end, and that end accomplished. It tells us that God has not created the world and left it to itself, remaining ever after a quiescent spectator of his own work: for it puts before our eyes the certain proofs, that during successive periods there have been, not only great changes in the external conditions of the earth, but corresponding changes in organic life; and that in every such instance of change, the new organs, so far as we can comprehend their use, were exactly suited to the functions of the beings they were given to. It shews intelligent power not only contriving means adapted to an end: but at many successive times contriving a change of mechanism adapted to a change of external conditions; and thus affords a proof, peculiarly its own, that the great first cause continues a provident and active intelligence[*].

I forbear to dwell on other questions deeply connected with this science—Proofs of a higher temperature, as shewn by the organic forms of the old world—indications of the same kind, in the crystalline structure of the lower strata, and the masses on which they rest—and further proofs derived from the figure of the earth itself. The spheroidal form of the earth seems to have preceded all geological phenomena, and makes probable the condition of primeval fusion: and, following in the same train of thought, we have only to imagine another accession of heat, and the whole earth must have been dissipated through planetary space, and have appeared (were there then an eye like our own to behold it) as a mere expanded nebulosity[†].

---

[*] See Appendix, Note (C).

[†] See Appendix, Note (D).

Speculations like these, starting at least from actual phenomena, are not without their use. For, without lowering one jot the proof of a pre-ordaining intelligence, they point, through a long succession of material changes, towards a beginning of things, when there was not one material quality fitted to act on senses like our own ; and thus they take from nature that aspect of unchangeableness and stern necessity which has driven many men away from the light of natural religion, and some to downright atheism.

If, then, our planetary system was gradually evolved from a primeval condition of matter, we may well believe, that every material change within it, from first to last, has been but a manifestation of the Godhead, and an emanation from his immediate will— Or we may suppose, that new powers have, by an act of creative interference, been impressed on it at successive epochs of its changes ; and that these new powers, working together with the old, *may* have brought about the next system of material conditions*—Or, if it be thought more in conformity with what we see of the modes of material action, to suppose that the primeval system contained within itself the elements of every subsequent change, then is the primeval matter to the matured system of the world, as the seed to the plant, or the egg to the living creature. Following for a moment the last of these hypotheses—shall this embryo of the material world contain within itself the germ of all the beauty and harmony, the stupendous movements and exquisite adaptations of our system—the entanglement of phenomena, held together by complicated laws, but mutually adjusted so as to work together to a common end—and the relation of all these things to the functions of beings possessing countless superadded powers, bound up with life and volition? And shall we then satisfy ourselves, by telling of laws of atomic action, of mechanical movements, and chemical combinations; and dare to think, that in so doing, we have made one step towards an explanation of the workmanship of the God of nature? So far from ridding ourselves, by our hypothesis, of the necessity of an intelligent first cause, we give that necessity a new concentration, by making every material power, manifested since the creation of matter, to have emanated from God's bosom by a single act of omnipotent prescience.

---

* This second hypothesis (though at first sight less philosophical than either of the other two) is suggested by the analogy of the repeated changes of organic species, alluded to above, each of which can be regarded only as a positive creative interference.

Leaving, however, these subjects of lofty speculation, and retracing our steps from the first condition of created matter towards the order of things now going on before us, we see, from the form and structure of the solid masses on the surface of the earth, that many parts of it have been elaborated during successive periods of time; and if we cannot point out the first traces of organic life, we can find, at least, an indication of its beginning. During the evolution of countless succeeding ages, mechanical and chemical laws seem to have undergone no change; but tribes of sentient beings were created, and lived their time upon the earth. At succeeding epochs, new tribes of beings were called into existence, not merely as the progeny of those that had appeared before them, but as new and living proofs of creative interference; and though formed on the same plan, and bearing the same marks of wise contrivance, oftentimes as unlike those creatures which preceded them, as if they had been matured in a different portion of the universe and cast upon the earth by the collision of another planet. At length, within a few thousand years of the days in which we live (a period short indeed if measured by the physical monuments of time past), man and his fellow-beings were placed upon the earth. Of the whole creation, he alone has an appetence for abstract truth—he alone sees material powers, and by the capacity of his mind grasps at them, not as accidents but phenomena under some ruling law—and, in describing them, he uses language (and what is language but the connected natural signs of internal thoughts?) in which, in spite of himself, he describes the operations of intelligence and power. He turns these laws to his own account; by his own volition works upon them, and produces consequences important to himself and foreseen in his own mind: and thus he learns, from what he has done himself, and from the constitution of his intellectual nature, to see in all things around him contrivance and causation. All nature is but the manifestation of a supreme intelligence, and to no being but him to whom is given the faculty of reason, can this truth be known. By this faculty he becomes the lord of created beings, and finds all matter, organic and inorganic, subservient to his happiness, and working together for his good. A part of what is past he can comprehend; something even of the future he can anticipate; and on whatever side he looks, he sees proofs, not of wisdom and power only, but of goodness.

But these abstract powers form not the whole immaterial part of man. He has moral powers and capacities unsatisfied with what he sees around him. He longs for a higher and more enduring intellectual fruition—a nearer approach to the God of nature: and seeing that every material organ, as well as every vital function and capacity in things around him, is created for an end, he cannot believe that a God of power and goodness will deceive him; and on these attributes he builds his hopes of continued being, and future glory*.

This is the true end to which the religion of nature points. Her light may be but dim, and beyond the point to which she leads us there may be *a way which the vulture's eye hath not seen, the lion's whelp hath not trodden, nor the fierce lion passed*—a cold and dismal region, where our eyes behold none but the appalling forms of nature's dissolution: but here our heavenly Father deserts us not; he lights a new lamp for our feet, and places a staff in our hands, on which we may lean securely *through the valley of the shadow of death*, and reach and dwell in a land where death and darkness have heard the doom of everlasting banishment.

In ending this portion of my discourse, let me exhort you not only to mingle thoughts like these with your abstract studies, but to give them an habitual personal application—to seek above all things a spirit of single-mindedness and humility—to believe yourselves in the perpetual presence of God—to adore him in the glories of his creation—to see his power and wisdom in the harmony of the world—his goodness and his providence in the wonderful structure of living beings—Not merely to admit these things as general truths, but to make yourselves familiar with them by frequent trains of reasoning founded on such examples as are continually before you*.

---

* See Appendix, Note (E).

To deny all natural religion is not more strange than to commence a system of moral philosophy by denying the existence of moral feelings. It is, I think, to deny that very constitution of our minds on which the foundation of our religious character must be laid. How such a character is matured and upheld I do not now inquire: but among persons of intellectual habits, it depends for its commencement mainly on the conduct of the mind in early life: and during the changes of advancing years cannot perhaps be so well upheld by any ordinary means as by a steady habit of seeing, and adoring with thankfulness of heart, the wisdom and goodness of God in the wonders and bounties of his creation. The materials for thoughts like these are placed abundantly around us.

To many minds, the forms of natural knowledge, presented in the abstractions of severe science, are cold and uninviting: but if we follow them with the light of other kindred studies, such as those I have endeavoured faintly to shadow out, we bring down the fire from heaven which at once gives them movement and animation.

II. In the comments I think it right to make on the second branch of our studies, I may take for granted that every one of those whom I now address, has from his tender years been taught the languages of Greece and Rome, and is familiar with at least a portion of their literature. It is no part of my object either to praise or blame the system of early education in this country: but, before I pass on, I may recall to your minds the wonderful ease with which a child comprehends the conventional signs of thought formed between man and man—not only learns the meaning of words descriptive of visible things; but understands, by a kind of rational instinct, the meaning of abstract terms, without any apparent effort of that faculty by which he separates them from the names of individual objects of sense. The readiness with which a child acquires a language may well be called a rational instinct: for during the time that his knowledge is built up, and that he learns to handle the implements of thought, he knows no more of what passes within himself, than he does of the structure of the eye, or of the properties of light, while he attends to the impressions on his visual sense, and gives to each impression its appropriate name. As the memory becomes stored with words, and the mind accustomed to their application, this readiness of verbal acquisition gradually decays, and at length, with some persons, almost disappears. That this is true, I need only appeal to the experience of those who, after being long disused to such studies, have attempted to learn a language. They will tell you of their feeling of mental drudgery and intolerable fatigue. during their slow, laborious progress, in acquiring what a child gains without knowing how, and a young person learns cheerfully and without a sense of toil. A small part of these remarks applies only to our vernacular tongue and to oral teaching: the greater part bears on the acquisition of all languages—the dead as well as the living. Our fathers then have done wisely, and followed nature, in making the study of languages a part of our earliest discipline. By this study we gain access to the magazines of thought—we find our way through the vast storehouses wherein are piled the intellectual treasures of a nation, as soon as we have capacity to understand their value, and strength to turn them to good account.

---

* See Appendix, Note (F).

With individuals as with nations, the powers of imagination reach their maturity sooner than the powers of reason; and this is another proof, that the severer investigations of science ought to be preceded by the study of languages; and especially of those great works of imagination which have become a pattern for the literature of every civilized tongue. From time to time there arise upon the earth men who seem formed to become the center of an intellectual system of their own. They are invested, like the prophet of old, with a heavenly mantle, and speak with the voice of inspiration. Those that appear after them are but attendants in their train—seem born only to revolve about them, warmed by their heat and shining by their reflected glory. Their works derive not their strength from momentary passions or local associations, but speak to feelings common to mankind, and reach the innermost movements of the soul; and hence it is that they have an immortal spirit which carries them safe through the wreck of empires and the changes of opinion.

Works like these are formed by no rule; but become a model and a rule to other men. Few, however, among us are permitted to shew this high excellence. Ordinary minds must be content to learn by rule; and every good system of teaching must have reference to the many and not to the few. But surely it is our glorious privilege to follow the track of those who have adorned the history of mankind—to feel as they have felt—to think as they have thought—and to draw from the living fountain of their genius. Close and animating is the intellectual communion we hold with them! Visions of imagination starting from their souls, as if struck out by creative power, are turned into words, and fixed in the glowing forms of language: and, after a time, the outward signs of thought pass before our sense; and, by a law of our being not under our control, kindle within us the very fire which (it may be thousands of years ago) warmed the bosom of the orator or the poet—so that once again, for a moment, he seems in word and feeling, to have a living presence within ourselves!

As the body gains strength and grace by the appropriate exercise of all its members, so, also, the mind is fortified and adorned by calling every faculty into its proper movement. No one will indeed deny, that the imaginative powers are strengthened and the taste improved, especially in young minds, by the habitual study of models of high excellence. It may, however, at first sight well admit of question, when we consider the shortness of life and the multitude of things demanding our efforts and pressing on our attention, whether a study of the dead languages ought to form so prominent a part of academic discipline. Had Europe, after the darker ages, advanced to civilization without the aid of ancient learning, this question might not have been so readily answered in the affirmative. But, without troubling ourselves with imaginary difficulties, we may reply—that the best literature of modern Europe is drawn more or less from the classic source and cast in the classic mould; and can neither be felt or valued as it ought without ascending to the fountain-head—that our superstructure must suffer if we allow its foundations to decay. If this answer be not thought sufficient, there is another which admits of no reply, and the force of which no time can take away. Our classical studies help us to interpret the oracles of God, and enable us to read the book wherein man's moral destinies are written, and the means of eternal life are placed before him.

Assuming then that our fathers have done well in making classical studies an early and prominent part of liberal education; there still remains a question whether they are wisely followed up in the system of our University. Those who are best acquainted with our studies will confess with what delight they have witnessed the extent and accuracy of erudition displayed, of late years, by many of our younger members. Whatever is taught in this place ought to be taught profoundly: for superficial information is not merely of little value, but is a sure proof of bad training. Hence, that critical skill which teaches men to dissect the ancient languages—to unravel all the subtilties of their structure—and to transfuse their whole meaning into a translation, well deserves the honors and rewards we have long bestowed upon it.

In the department of verbal criticism some of the mighty men whose names adorn our domestic history (and whose remembrance we keep alive by this day's ceremonial) have earned a lasting fame; and have proved how in their hands, that knowledge, which with vulgar minds is trifling and without fruit, can be made to assist in the illumination of history, the detection of sophistry, and the support of sacred truth. Few persons are, however, gifted with the powers of a Bentley or a Porson: and were we permitted, on a day like this, to allude to the imperfections of such men, we might perhaps lament, that so little even of their time was employed on matter worthy of the giant strength that God had given them.

I think it incontestably true, that for the last fifty years our classical studies (with much to demand our undivided praise) have been too critical and formal; and that we have sometimes been taught, while straining after an accuracy beyond our reach, to value the husk more than the fruit of ancient learning: and if of late years our younger members have sometimes written prose Greek almost with the purity of Xenophon, or composed iambics in the finished diction of the Attic poets, we may well doubt whether time suffices for such perfection—whether the imagination and the taste might not be more wisely cultivated than by a long sacrifice to what, after all, ends but in verbal imitations—in short, whether such acquisitions, however beautiful in themselves, are not gained at the expense of something better. This at least is true, that he who forgets that language is but the sign and vehicle of thought, and while studying the word, knows little of the sentiment—who learns the measure, the garb, and fashion of ancient song, without looking to its living soul or feeling its inspiration—is not one jot better than a traveller in classic land, who sees its crumbling temples, and numbers, with arithmetical precision, their steps and pillars, but thinks not of their beauty, their design, or the living sculptures on their walls—or who counts the stones in the Appian way instead of gazing on the monuments of the "eternal city."

There is one province of verbal criticism which has often been overlooked, or set at nought, and yet would abundantly repay the labour of its cultivation. Words are the signs of thought; and from words themselves (without following them through all their inflexions and combinations in the finished structure of a language) we may see into the natural feelings and judgments of men, before they become warped by the prejudices of sect or the subtilties of system. If in reading the ancient writers. we meet with words describing virtue and vice, honor and dishonor, guilt and shame, coupled with the strongest epithets of praise or condemnation; then we are certain that these things existed as realities before they became words; or at least, that in the minds of those who, during the early progress of society, built up the ancient languages, they were considered as realities; and on that account (and that account only) had their representatives among the symbols of thought. I believe we might in this way make a near approach to a true system of moral philosophy: and our progress would at every step record a series of judgments, not derived from any doubtful train of reasoning, but forced on mankind by the very condition of their existence.

In following up the manly studies of this place, we ought to read the classic page, not merely to kindle delightful emotions—to gratify the imagination and the taste—but also to instruct the understanding; and to this end the philosophical and ethical works of the ancients deserve a much larger portion of our time than we have hitherto bestowed on them. It is indeed notorious, that during many past years, while verbal criticism has been pursued with so much ardour, the works to which I now allude (coming home, as they do, to the business of life, and pregnant, as they are, with knowledge well fitted to fortify the reasoning powers) have, by the greatest number of us, hardly been thought of; and have in no instance been made prominent subjects of academic training. The classical writers did not cultivate the imagination only; but they saw deep into the springs of human thought and action: and rightly apprehending the capacities of man and their bearing on social life, they laid the foundation of their moral systems in the principles and feelings of our nature, and built thereon a noble superstructure. Should any one object to these ancient systems (as Paley and many other writers have done), and tell us that they are obscure, indefinite, and without sanction: we might reply, that in every question, even of physical science, we take but a few steps towards a first cause, before we are arrested by a boundary we cannot pass—before we are encompassed with a darkness no eye can penetrate:—that in moral questions (founded, not on the properties of material agents, which we can examine and sift, again and again, by new experiments, but on the qualities of rational and responsible beings), still narrower is the limitation of our inquiries. To suppose that we can reason up to a first cause in moral questions—that we can reach some simple principle, whence we may descend with logical precision to all the complicated duties of a social being; is to misapprehend the nature of our faculties, and utterly to mistake the relation we bear both to God and man. Such a system may delight us by its clearness, and flatter our pride because it appears, at once, to bring all our duties within our narrow grasp: but it is clear only because it is shallow; while a better system may seem darker, only because it is more profound.

If it be contended, that in the trying circumstances of life the moral systems of the ancients are without sufficient motives: we may reply, that in this respect all moral systems are alike—that all of them lead to consequences, and point to actions, beyond the power of any earthly sanction. When we ascend to the highest virtues and capacities of our moral nature, and think of the tens of thousands who in every age have encountered a voluntary death for the good of their kindred men and the glory of their country, or the still more exalted heroes who have died as solitary martyrs in the defence of some high and holy principle; we tell of deeds which moralists and historians of every age have adorned with their praise, and held up for imitation. But still, however common acts like these may have been in the history of mankind, we have no right to class them as social duties, grounded in mere moral and social feelings; and in accounting for them, our souls recoil from the vulgar sanction of this world's praise. If deeds like these be compatible with our nature; then is there something within us, which, however obscured or ill-informed, points to a higher destiny: and in asking for motives, we must quit the province of morals, and enter on that of religion; and in its hopes, faint and feeble as they may often be, we may not only find an answer to our question, but a reason why such high feelings and capacities are implanted in us; leading us, as they do, into acts opposed to the strongest instincts of our nature, and above the sanction of all ordinary moral rules.

It is, I think, certain that the study of an ethical system, grounded on the moral and social feelings, and exemplified by that course of action which in all ages has been honoured by the virtuous and the wise, is not only a good practical training for the mind (which in the busy commerce of life has often more to do with moral than with physical reasoning), but prepares it for the acceptance of religious truth. Whether this opinion be true or false, it is at least certain, that many of the writers of antiquity had correct notions on the subject of natural religion. The argument for the being of a God, derived from final causes, is as well stated in the conversations of Socrates, as in the Natural Theology of Paley. Nor does Socrates merely regard God as a powerful first cause, but as a provident and benevolent being: and he tells us, that as man is the only animal with a soul capable of apprehending a God, he is the only being by whom God is worshipped—that prayer and sacrifice are our duty—that by such services we may learn some of the secrets concealed from men, and know, that the Divinity sees every thing, hears every thing, is present everywhere, and cares for all his works. Few however of the heathen Philosophers conceived or uttered sentiments like these; and trained as they were in a superstition which deified their bad passions, and sanctioned their vices under the impure forms of its religious rites, we need not wonder at their limited knowledge of the attributes of God, or their feeble hopes of a more exalted state of future being*.

In speaking of the spirit which ought to guide us in our classical studies, we must look also to their lessons of practical wisdom. History is to our knowledge of man in his social capacity, what physical experiments are to our knowledge of the laws of nature: and well it is for that country which learns wisdom by the experiments of other nations. In ancient history we can not only trace the fortunes of mankind under almost every condition of political and social life; but all the successive actions we contemplate are at such a distance from us, that we can see their true bearings on each other undistorted by that mist of prejudice with which every modern political question is surrounded. We may see that the higher virtues, which are the only secure foundation of a nation's strength, are confined to no time or country; and, although sometimes called into their fullest action by a sudden and trying circumstance, are in the common course of things but the slowly matured fruit of good discipline and good government. We may look on states rising out of small beginnings, and watch the means by which they gradually ascend in the scale of national strength. We may mark the giant power of despotism wasting away before a petty combination of free men. We may see that liberty is the handmaid of genius and virtue—that under her fostering care, feelings and sentiments, embodied in national literature, spring up and knit men together as one family, and for a time give them an almost unconquerable might—and lastly, that the loss of national sentiments and national independence, whether commencing in decay from within or violence from without, is alike followed by moral and physical desolation.

---

* See Appendix, Note (G).

We study to little purpose, if while we unroll the history of past time we look but at one side of the portraiture of our race. If we read in it the maxims of wisdom, we find also the annals of crime. If great actions have shewn man's high capacities, the sins and follies, by which all history is blotted, prove also the feebleness of his purpose. We may find in every page the records of selfishness—the desolation produced by the jarring interests of faction. We may see that the foulest crimes have oftentimes been enacted under the fairest forms of government; and that in all conditions of a state (from its beginning to its end) corruption of manners is ever incompatible with true liberty. We may trace the history of a vast empire, from its first beginnings—find it, after many mutations of fortune, rising to great power by the exercise of great virtue—and during the lapse of ages, see its citizens jealous, even to a crime, of their civil freedom. We may then go on, and find the same people becoming willing tools in the hands of bad men, and, at length, so utterly corrupt, as to rush, with one consent, into the basest servitude: and in those evil days, we may find that even the best men were willing to surrender their inheritance, and to seek, in the despotic authority of one, a refuge against the more intolerable license of the many. We leave however our lesson incomplete if we follow not this history to its end, and see that the calm of despotism, superinduced on a corruption of manners, is followed by a stagnation of all the higher virtues which minister to national strength; and so becomes but the dismal presage of dismemberment and final dissolution.

In the moral, as in the physical, convulsions of the world, the good and the bad are often mingled together in a common calamity; and were we to limit our views to this life only, we might see, in the dealings of God with man, much to perplex and to confound us. Still it is true, even in this narrow view, that there is in the history of past times enough to shew that God will in the end vindicate his character as a moral governor: for we find, that in all ages virtue and wisdom have been the only firm supports of national strength—and that as in individual men, where sin rules in the bodily members, there is a degrading moral servitude, and a loss of capacity for high thought and action—so also that among states and empires, depravity of manners has ever been followed by a loss of glory and a loss of freedom. Hence we may conclude on a large experience, grounded on all history, past or present, sacred or profane, that those public men who have sought to gain their ends by inflaming the bad passions of the people and pandering to their vices, have been traitors to the cause of true liberty, and blasphemers against the very God they professed to worship.

Another conclusion, not less general than the former, may also be drawn from the universal experience of past history —that under no form of government is man to be maintained in a condition of personal happiness, and social dignity, without the sanction of religion. Finally, as all material laws, and all material organs throughout animated nature, are wisely fitted together, so that nothing, of which we comprehend the use, is created in vain; and as the moral and intellectual powers of man, working together according to the laws of his being, make him what he is—teach him to comprehend the past and almost to realize the future—and rule over his social destiny; we may surely conclude, as a fair induction of natural reason, that this religious nature (so essential to his social happiness) was not given to him only to deceive him; but was wisely implanted in him, to guide him in the way of truth, and to direct his soul to the highest objects of his creation. And thus we reach (though by steps somewhat different) the same end to which I endeavoured to point the way in the former division of this discourse.

III. I now enter on the third branch of our studies, in which we are ourselves considered philosophically, as individuals, and as social beings. Under this head are included, as was observed before, many subjects of great complexity, requiring for their investigation long habits of patient thought —bearing directly on the business of life—and in their application deeply affecting our moral and intellectual characters. If the shortness of time permits us not, in our academic system, to enter largely on this great province of inquiry, and if some departments of it are fitted only for the labours of after life; we are at least bound to give, as far as we are able, a right bias to the youthful sentiments on all great questions concerning human nature; so that those who begin their moral studies here may be enabled to lay a good foundation, whereon, in maturer manhood, they may build in safety.

Locke's "Essay on the Human Understanding" and Paley's "Principles of Moral and Political Philosophy" have long formed such prominent subjects of instruction in this University, that the remarks I have time to make on our metaphysical and ethical studies will be almost confined to these two works.

It is, perhaps, unnecessary for me to inform you, that Locke supposed the mind to be first of all "as white paper, void of all characters," and that all its subsequent ideas—all its materials of reason and knowledge—are derived from two sources, sensation and reflection. By ideas from sensation he means the natural perceptions we have of external things through our senses; by reflection he understands the notice the mind takes of what passes within itself, "whereby it becomes furnished with ideas of its own operations:" and he affirms, "that however great the mass of knowledge lodged within the mind, there can be nothing there which did not come in by one of these two ways."

It is incontestably true, that the senses are the first avenues of our knowledge, and that through them we become first acquainted with external things. In describing the modes in which the mind is furnished with knowledge through the senses, the "Essay on the Human Understanding" is, I think, rather to be considered as defective in execution, than faulty in principle. Since its publication, much good service has been done in this department of inquiry, by Reid and other writers; but much, if I mistake not, still remains to be done; and were I to speculate on the coming fortunes of the philosophical literature of this country, I should look forward to the time when some one, learned in physiology, instructed in all the laws of those elastic fluids by which we are surrounded and acted on, and skilled in the analysis of the inner workings of the mind, shall bring his strength to bear on this one subject, and present us with a work detailing the whole office of the senses, from childhood to manhood—from the dawn of reason to its full maturity.

In discriminating the ideas we derive from reflection, and pointing out the modes in which the mind is gradually raised to its full strength and stature, the "Essay on the Human Understanding" is not only defective in execution (sharing the common fortune of man's work), but is also, I think, faulty in its principles. The account it gives of some of our simplest abstract notions is erroneous: parts of the work are doubtful and obscure; and the whole greatly devoid of philosophic symmetry and order*. Still there are, in every chapter of it, the marks of deep thought—of a strong mind, clearing away the masses of intellectual rubbish by which his whole subject was encumbered—and, above all, of a lofty independent spirit, holding allegiance to no authority but that of truth. Hence, whatever the coming history of letters may bring to light, I cannot imagine the day when the works of Locke, under proper limitations, will not form noble subjects for academic study.

Men seem to differ little in the impressions they first receive from their senses; and perhaps quite as little in the first abstractions they are by nature led to form. Yet how widely separated is one intellect from another! From the stones of the same quarry one man builds a hovel; another chisels out the breathing image of the human form. It is incontestably true, that men are chiefly distinguished from each other by their habits of combining the same original elements of thought. But, in making these combinations, they are not led on blindly and fortuitously, but in obedience to intellectual laws operating with greater or less force on every rational being. What would be the value of the senses were there no sentient principle within? And where would be the use of teaching were there no inborn capacities in the soul to apprehend and to be acted on! It may be true that we have no innate knowledge; but we have innate intellectual powers: and that they are essentially the same in all men, differing only in degree, is evident from the individual habits, the social sympathies, the civil institutions, and the languages of our race; the common feelings that hurry us into action; the common proofs that gain our deliberate assent.

---

* It is impossible, in a sketch like this, to descend into particulars; but, without alluding to the faults of omission, I may, in justification of what is here stated, point out, by the way, that Locke's account of the origin of our idea of *time* is universally considered as wrong—that by a large school of metaphysicians his account of our knowledge of space is regarded as not less erroneous—that most men look upon his discussions, respecting personal identity and the determination of the will, as either defective or false—and that all men regard his dissertation on *power* as crude and obscure.

The distinction between innate ideas and innate capacities is almost overlooked in the work of Locke*. To this cause we must attribute the greatest mistakes and imperfections of his system, and the strange omission of many of the highest faculties of our nature. Of the imaginative powers he hardly says one word, or speaks of them only to condemn them. Yet are they so woven into our nature that they mingle themselves with almost every word and deed—aid us in the interchange of thought -ever give delight, in their exercise, both to savage and civilized man—nor can they for a moment be put off, except by an effort of the mind, in the severe abstractions of exact science. For a metaphysician to discard these powers from his system, is to shut his eyes to the loftiest qualities of the soul, and is as unaccountable as it would be for a physiologist to overlook the very integuments of our animal frame.

---

* The habit of disregarding the distinction between abstract capacities and their particular manifestations, seems to have led Locke into his strange paradox respecting personal identity. Consciousness (in the sense in which he uses the word) is the proof of our own identity to ourselves: and it is through this principle, in our nature, that we know that we continue one and the same being, and feel that we are personally responsible for our past actions. Remembering or associating the past with the present is one of the faculties of a rational being. But the individual mind existed anterior to the manifestation of this faculty; otherwise there is no common connecting principle among our thoughts, and no such thing as personal identity. In the chapter on "our ideas of substances," he considers a "spiritual substance as the *substratum* of those simple ideas we have from without;" and he justly discriminates between the soul itself and the manifestation of its powers. His distinction is well drawn; but it is, I think, at variance with his discussion on personal identity.

It is by the imagination, more perhaps than by any other faculty of the soul, that man is raised above the condition of a beast. Beasts have senses in common with ourselves, and often in higher perfection: to a certain extent also they possess, I think, the powers of abstraction, though this is denied by Locke; but of the imaginative powers they offer perhaps no single trace. These high attributes of the soul confer on it a creative energy—aid it even in its generalizations from pure reason—bring before it vivid images of the past and glowing anticipations of the future—teach it to link together material and immaterial things, and to mount up from earth to heaven. All that is refined in civilized life, all that is lofty in poetry or ennobling in art, flows chiefly from this one fountain.

As a matter of fact men do possess imaginative powers, and ever have delighted, and ever will delight in their exercise: and to exclude them from a system of pyschology is to mutilate, and not to analyse, the faculties of the soul. They may have been abused; but what of that? every faculty has been abused and turned to evil. Shall we, then, not merely overlook the powers of imagination; but, with Locke, regard men who appeal to them in their proofs and mingle them in their exhortations, as no better than downright cheats? If this be our conclusion, then must the sublime morality of Job—the inspired song of David—the rapturous anticipations of deliverance in the prophecies of Isaiah, stamped in the loftiest forms of poetic imagery, and falling on the ear as if proclaimed by an angel's voice from the gates of heaven—and the fervent testimony of thousands of holy men in every age declaring and enforcing the oracles of God—all and every one of these heart-stirring appeals must fall under our cold and senseless condemnation.

In denouncing the exercise of the imagination as a fraud upon the reason, Locke would have done well had he been considering mere demonstrative truth; but I find no such limitation to his censures. All reason is not mathematical, nor is all truth demonstrative: and one fault of the Essay of Locke is its attempt to extend too far the boundaries of demonstration. It would indeed be as absurd to apply imaginative language to the demonstrations of pure reason, as to apply the language of demonstration to the analysis of ideal beauty. Each faculty must have its proper place; but none can be lopped off without marring the handiwork of God.

If it be demanded what is the office of the imagination? we may reply that its office consists in its appropriate exercise conjointly with every other faculty of the soul. In one respect, however, its use, as well as its abuse, is so obvious as to deserve a formal notice. Men decide not on reason only—incline not naturally to the right side, like the scale of a balance, by the mere weight of evidence. They act in common cases through habit or affection; and in trying circumstances the determination of the will is often more by feeling than by reason. Hence the imaginative powers, in kindling up the active feelings of the soul, have ever been mighty instruments of persuasion, whether for good or for evil. When Demosthenes, in pleading before the Athenian multitude, swore by his fellow-countrymen who had perilled their lives in battle on the field of Marathon—and when St Paul, speaking in the presence of King Agrippa, held up his hand before the assembled crowd and wished to God that every one of them was not only almost but altogether as himself excepting his bonds—each spoke from the momentary fulness of his own feeling—each spoke to the hearts and bosoms of those around him; and put forth a weapon of persuasion a thousand times more sharp than ever issued from the cold armory of reason.

Another great fault in the Essay of Locke (involved, I think, in his very system, which looking only to the functions of the soul forgets its innate capacities), is its omission of the faculties of moral judgment. That such faculties exist, is proved by the sense of shame in a child, by the natural feelings of manhood, by the language of every country, and the code of every nation: and lastly, by the word of God, which speaks of conscience not as a word of convention—a mere creation of the social system; but as something implanted in our bosoms by the hand of our Maker, to preside there and pass judgment on our actions. We read of men *convicted in their own conscience*—*living in all good conscience*—we are told *of the law written in the hearts* (*of the Gentiles*), and of *their conscience also bearing witness*—we read of *a conscience void of offence*—of *the answer of a good conscience towards God*—of *holding faith and a good conscience*—and of *a conscience seared with a hot iron* through long familiarity with sin. What meaning have words like these, if we may at our own will strip conscience of its sanction, and think of it no longer as a heaven-born rule of action?

The faculties of moral judgment, combined to a certain degree with powers of choice and liberty of action, not only distinguish us from the lower beings of creation, but constitute the very essence of our responsibility, both to God and man. Their omission, then, is a great blemish in any system of psychology.

Let it not be said that our moral sentiments are superinduced by seeing and tracing the consequences of crime. The assertion is not true. The early sense of shame comes before such trains of thought, and is not, therefore, caused by them; and millions, in all ages of the world, have grown up as social beings and moral agents, amenable to the laws of God and man, who never traced or thought of tracing the consequences of their actions, nor ever referred them to any standard of utility. Nor let it be said that the moral sense comes of mere teaching—that right and wrong pass as mere words, first from the lips of the mother to the child, and then from man to man; and that we grow up with moral judgments gradually ingrafted in us from without, by the long-heard lessons of praise and blame, by the experience of fitness, or the sanction of the law. I repeat that the statement is not true—that our moral perceptions shew themselves not in such order as this. The question is one of feeling; and the moral feelings are often strongest in very early life, before moral rules or legal sanctions have once been thought of. Again: what are we to understand by teaching? Teaching implies capacity: one can be of no use without the other. A faculty of the soul may be called forth, brought to light, and matured; but cannot be created, any more than we can create a new particle of matter, or invent a new law of nature.

Philosophy is not grounded on external authority, but in the observed nature of the things we contemplate, whether they be material or immaterial. We may invent systems of legal ethics drawn from the prudential maxims of society, or we may act on a system of Christian ethics founded on the positive declarations of the word of God: but without an inherent moral capacity, without a moral sense placed in the breast of man, by the same hand that made him, the science of moral philosophy has not, I think, the shadow of any foundation whereon to rest.

Returning then to the point from which we started; if the mind be without innate knowledge, is it also to be considered as without innate feelings and capacities—a piece of blank paper, the mere passive recipient of impressions from without? The whole history of man shows this hypothesis to be an outrage on his moral nature. Naked he comes from his mother's womb; endowed with limbs and senses indeed, well fitted to the material world, yet powerless from want of use: and as for knowledge, his soul is one unvaried blank; yet has this blank been already touched by a celestial hand, and when plunged in the colours which surround it, it takes not its tinge from accident but design, and comes forth covered with a glorious pattern.

If the senses be the first link, connecting the soul with the world without, it is equally certain that they are no sooner excited, than the affections begin to shew themselves: not long after, the moral and imaginative powers appear to germinate—feebly and interruptedly it may be, yet with vigour enough to shew that they were rooted in the soul by the same hand that formed it. The powers of pure reason come later into exercise: and at length, by the joint action of all his powers, man becomes what he is—a social, a moral and an intellectual being—fitted in all his capacities for the material world without, and for the social condition in which God has placed him. Some of his faculties may be powerless because untried—may have withered for want of nourishment; others by good training may have reached their full maturity: but no training (however greatly it may change an individual mind) can create a new faculty, any more than it can give a new organ of sense. In every branch of philosophy the limitations are alike; we may observe the phenomena and ascend to laws, and, by another movement of the mind, ascend to the notion of intelligent causation: but in coming down from these laws to their practical application, creative power is ever out of question with us, whether we have to do with the material or immaterial world; and every change produced by philosophic skill is still subordinate to all the phenomena from which we first ascended.

To the supposition of an innate capacity of moral judgment, some one may oppose the passions, the vices, and the crimes of mankind; and thence infer, either that man is without moral capacity, or that conscience is utterly devoid of sanction. We may, however, reply, that under the blind impulse of passion men not only take that side which their conscience warns them to be wrong, but also in a thousand cases wilfully do that which reason tells them to be against their highest interest: and if, after all this, we do not deny the faculty of reason, neither ought we to deny the reality of a moral sense. In a diseased action of the bodily frame, the organs of life may become the implements of death: but no one, on that account, discards the inductions of physiology—denies that all parts of the frame are skilfully knit together—or ceases to believe that every organ has its fitting use. So in the immaterial part of man, sin, like a burning fever, may make havoc among his highest faculties, and end in moral death: but we have no right on that account to regard sin as our proper condition, or to affirm that it is not a moral pestilence destructive of the supreme law of our moral nature. Neither have we any right to say that it blots out the knowledge of good and evil, and overturns the judicial throne of conscience. Such a decision is at war with the recorded judgments of mankind, and strikes at the foundation of all human law. Sin may hold our souls in bondage; but, so long as reason lasts, it destroys not our responsibility; nor is the continued perpetration of crime ever tolerated as a plea in bar of a penal sentence.

The objection just considered, does however prove the feebleness of moral rule—shows that there is something wrong within us, which jars with nature's harmony—that there is in the moral government of God much that is beyond the grasp of mere philosophy; and so teaches us to look beyond this world, and in the consolations of religion and the hopes of a future life to seek a better and a higher sanction; and in the motives of Christian love to find a steadier and more abiding principle of holy action, than all the philosophy upon earth ever has given or ever can give to man in the hour of temptation*.

With all its faults, the "Essay on the Human

---

* On the subject here alluded to, I would earnestly recommend to the reader's perusal an excellent sermon by Dr. Chalmers, entitled "The Expulsive Power of a new Affection." *Glasgow*, 1823.

Understanding" is a work of great power; and were any one to need a proof of this, he has only to consider the impression it produced on the speculations of a former age. Its greatest fault is the contracted view it takes of the capacities of man—allowing him, indeed, the faculty of reflecting and following out trains of thought according to the rules of abstract reasoning; but depriving him both of his powers of imagination and of his moral sense. Hence it produced, I think, a chilling effect on the philosophic writings of the last century: and many a cold and beggarly system of psychology was sent into the world by authors of the school of Locke; pretending, at least, to start from his principles, and to build on his foundation. It is to the entire domination his "Essay" had once established in our University that we may, perhaps, attribute all that is faulty in the Moral Philosophy of Paley—the work on which I now proceed to comment.

I would ever wish to speak with reverence of a man whose name is an honour to our academic body, and who did, I believe, during his time, much more for the cause of revealed truth than any other writer of his country. His homely strength and clearness of style, and his unrivalled skill in stating and following out his argument, must ever make his writings popular: and, speaking for myself, I cannot describe, in terms too strong, the delight I once experienced in studying his Moral Philosophy, where truth after truth seemed to flash on the mind with all the force of demonstration—on questions too which, in other hands, seemed only involved in mystery and doubt. On this account, if there be a defective principle in his system, it ought the more boldly to be combated, lest the influence of his name and the charm of his philosophic manner, lead us only the farther from the truth.

He commences by denying the sanction and authority of the moral sense; and brings the matter to a point, by putting forth an instance, which, like an *experimentum crucis*, is at once to be decisive of the question. Having detailed a case of cold-blooded parricide, he asks whether "a savage, cut off in his infancy from all intercourse with his species, would, when told of this, feel any sentiment of disapprobation." We may reply, (as Paley seems to do) that he certainly would not: for neither could he possibly comprehend the meaning of the tale; nor, if he did, could he find a word to express his natural abhorrence of the crime. If this reply be thought too technical, and only a shifting of the difficulty, we may meet the case in a different way, and combat one ideal instance by another. Suppose a solitary being placed from childhood in the recesses of a dungeon and shut out from the light of day, then must he grow up without one idea from the sense of sight. But should we thence conclude that the sense was wanting? Let him be brought into the light; and by laws of vision, over which he has no control, he will, like other beings, gain knowledge from the sense of sight. Let the solitary savage, in like manner, come from the recesses of the forest into commerce with his fellow-beings; and he will also, by the law of his moral nature, as inevitably gain a sense of right and wrong; and he will then pass a natural judgment on the crime of parricide, like that of any other rational and responsible man. No one now speaks of an innate knowledge of morality: an innate moral sense or faculty, defining and determining the quality of our moral judgments, is all for which we contend; and Paley's instance is quite worthless for his argument.

Had he grounded his rejection of the moral sense on the avowed depravity of our nature, and the impotency of moral rule in putting down the evil that is at war with our better feelings. we should, with one mind, have allowed the force of his objection; and some would, I doubt not, have accepted his conclusion. In so doing they would however have done wrong: for the rejection of the moral sense, on religious grounds, is one of the errors of fanaticism. Amidst all the ruin that is within us, there are still the elements of what is good; and were there left in the natural heart no kindly affections and moral sentiments, man would be no longer responsible for his sins; and every instance of persuasion against the impulse of bad passion, and of conversion from evil unto good, would be nothing less than a moral miracle. On such a view of human nature, the Apostles of our religion might as well have wasted their breath on the stones of the wilderness as on the hearts of their fellow-men in the cities of the heathen.

Had Paley, rejecting the authority of the moral sense on grounds like these, proceeded to build up a system of Christian ethics, founded on the word of God, enforced by its heavenly sanction, and recommended through the affections to a practical acceptance as a rule of life, he might have conferred a great benefit on the cause of morality and religion. He might then have gone on to shew, that the code of Christian morals contains a set of rules co-ordinate with other rules which the wise and the good of all ages have endeavoured to establish and enforce (with a fainter light indeed, and under a more feeble sanction) as in accordance with the law of our nature, and therefore with the will of God: and afterwards he might have proved, that the rules of action, derived from these two sources, are not only in conformity with each other, but call our highest faculties into activity, and return into our bosoms incomparably the greatest sum of earthly happiness. Thus might he have arrived at a perception of an attribute of God, in the only way in which it is permitted us, by the mere force of natural reason, to reach high points of knowledge—by ascending from particular to general truths, from phenomena to laws; and thus might he have concluded, that as in the material world we see in all things the proofs of intelligence and power; so also, that in the immaterial world we find proofs, not less strong, that man is under the moral government of an all-powerful, benevolent, and holy God. Following this train of thought he might, lastly, have enunciated a proposition (resembling in its words what stands in the front of his moral system, but far different in its meaning and incomparably more true), that whatever is right is also expedient for man.

Whatever be the faults of Paley's system, assuredly they spring not from fanaticism. After rejecting the moral sense, but on no such grounds as have been just imagined, he proceeds to prove (by reasoning I shall shortly examine) that actions are only to be estimated by their general tendency—that utility is the touchstone of right and wrong. Here we have a rule, simple in its enunciation, and flattering to human pride: for man no longer appears as the subject of a law, but presides with the authority of a judge, and his rule of action is the leading interest of himself and his fellow-men.

In the material world we have no control over the laws of nature; we gain physical knowledge only by studying them; and new physical power only by obeying them: and in questions of morality—of right and wrong—we are equally the servants of a law, either written in the heart or recorded in the word of God. To hesitate is to rebel; and to wait for the calculations of utility, would be, too often, but to seek a cloak of sophistry to cover our escape from a positive duty.

Leaving, however, mere general objections, let us come to the system itself, and to the rule of its application. Paley first resolves all right into consistency with the will of God: and here, at least, is no matter for dispute; for every moral system implies some law or other, which can only emanate from God, and to obey that law is plainly to obey his will. But how are we to discover that will? We answer, by studying the moral nature of man, and his relation to the things around him—by ascending from moral phenomena to moral laws, which thus become the manifestations of the will of God, and may be embodied in the maxims of moral philosophy: or, by humbly accepting the revelation of his will, which is religious knowledge. But by whatever means we try to discern the will of God—by whatever path we endeavour to ascend towards his holy temple—we see but in part and understand in part; we grasp not one of his attributes; we comprehend not how they co-exist within his bosom; we remain but worshippers at the gate; the veil which conceals him from us cannot be lifted up, nor could our eyes endure the brightness of his glory.

But how little does Paley seem to think of this when he reasons of his Maker as if he were a man, and dares to bind up the *great first cause* in the links of a single disjunctive proposition. God, as far as regards the interests of man, must be benevolent, malignant, or indifferent. This is the fundamental proposition of his moral system. But by what right can man set limits to the moral condition of the Almighty?—the creator of a million worlds, each bound to the others by never changing laws; and perhaps also of a million intellectual systems, each connected with our own by mysterious relations, conceived in his mind and preordained in his will, yet not revealed to us. In vain we try to comprehend even a single attribute of God; we know him only as he has thought good to reveal himself, by the law written in the heart—by the laws of the material world—and by the declarations of his word. He may, and does, consult his glory in countless ways we know not of. And is it not the height of arrogance in any creature like ourselves, to limit, even in thought, the workings of his power, and to confine the operation of his attributes to such channels only as our language can define and our souls can comprehend?

In the history of moral reasoning, there is not to be found a fundamental proposition more faulty in its principles, or more dangerous in its application, than the one just considered. Is it not notorious, that scoffing men, reasoning on like grounds and with like fallacy, have impugned the benevolence of God—have profanely dared to entangle the *great first cause* in a dilemma; pretending to prove, from the misery and desolation they saw around them, that he either wanted goodness or wanted power?

If the fundamental reasoning in Paley's system be unsound, its rule is unsuitable to our nature. If expediency be the measure of right, and every one claim the liberty of judgment, virtue and vice have no longer any fixed relations to the moral condition of man, but change with the fluctuations of opinion. Not only are his actions tainted by prejudice and passion, but his rule of life, under this system, must be tainted in like degree—must be brought down to his own level: for he will no longer be able, compatibly with his principles, to separate the rule from its application. No high and unvarying standard of morality, which his heart approves, however infirm his practice, will be offered to his thoughts. But his bad passions will continue to do their work in bending him to the earth; and, unless he be held upright by the strong power of religion (an extrinsic power which I am not now considering), he will inevitably be carried down, by a degrading standard of action, to a sordid and grovelling life.

It may perhaps be said, that we are arguing against a rule, only from its misapprehension and abuse. But we reply, that every precept is practically bad when its abuse is natural and inevitable—that the system of utility brings down virtue from a heavenly throne and places her on an earthly tribunal, where her decisions, no longer supported by any holy sanction, are distorted by judicial ignorance, and tainted by base passion. Independently however of the bad effects produced on the moral character of man, by a system which makes expediency (in whatever sense the word be used) the test of right and wrong, we may affirm, on a more general view, that the rule itself is utterly unfitted to his capacity. Feeble as man may be, he forms a link in a chain of moral causes, ascending to the throne of God; and trifling as his individual acts may seem, he tries, in vain, to follow out their consequences as they go down into the countless ages of coming time. Viewed in this light, every act of man is woven into a moral system, ascending through the past—descending to the future—and preconceived in the mind of the Almighty. Nor does this notion, as regards ourselves, end in mere quietism and necessity. For we know right from wrong, and have that liberty of action which implies responsibility: and, so far as we are allowed to look into the ways of Providence, it seems to be compatible with his attributes to use the voluntary acts of created beings, as second causes in working out the ends of his own will. Leaving, however, out of question that stumbling-block which the prescience of God has often thrown in the way of feeble and doubting minds, we are, at least, certain, that man has not foreknowledge to trace the consequences of a single action of his own; and, hence, that utility (in the highest sense of which the word is capable) is, as a test of right and wrong, unfitted to his understanding, and therefore defective or faulty in its application.

By what right, either in reason or revelation, do we assert the simple and unconditional benevolence of God; and, on this assumption, go on to found a moral system and a rule of life? If he be a God of mercy, is he not also a God of justice? Sin and misery are often among the means of bringing about the ends of his providence; and are so far consistent with his government, that they are permitted to last their time upon the earth. Nor is this all. The authority of any law may be abrogated by the same power that made it: and in the revealed history of the dealings of God with man, acts, which under ordinary circumstances would be crimes of the darkest die, have more than once been made tests of obedience or conditions of acceptance. Contemplations such as these make the unassisted reason shrink within itself through pure

f comprehending the whole moral govern-
m r the world. One thing, at least, they do prove—how rash and vain a thing it is for a feeble and narrow-sighted being like one of us, to construct a moral code on his own interpretation of a single attribute of the Godhead.

A religious man has a py escape out of all the difficulties of these dark qu ions. He feels within himself the liberty of choice his conscience tells him he is responsible for his a ns; the word of God points out a remedy for evils which encompass him: he applies the rem to himself in humble thankfulness, for it meet wants and is fitted to his capacity; and, in the rms of his acceptance into the Christian covenant, he finds no condition annexed but the love of God and man.

It may perhaps be said, that the moral system of Paley is compatible with the most exalted motives, inasmuch as it takes in the whole Christian sanction of a future state; and no man, under any reasonable view of morality and religion, can be called on to act in opposition to his eternal interests. Part of this observation may be just; but it gives no colour of truth to the moral system here considered, unless it can be also shewn, that our future condition, as revealed to us in the religion of Christ, depends on our following a rule of life, measured by the standard of utility. But is this true? I believe the contrary; and that *the holiness, without which no man shall see the Lord*, is as different from a temper governed (no matter how consistently) by any worldly rule whatever, as light from darkness.

Christanity considers every act grounded on mere worldly consequences as built on a false foundation. The mainspring of every virtue is placed by it in the affections, called into renewed strength by a feeling of self-abasement—by gratitude for an immortal benefit—by communion with God—and by the hopes of everlasting life. Humility is the foundation of the Christian's honour—distrust of self is the ground of his strength—and his religion tells him that every work of man is counted worthless in the sight of heaven, as the means of his pardon or the price of his redemption. Yet it gives him a pure and perfect rule of life; and does not, for an instant, exempt him from the duty of obedience to his rule: for it ever aims at a purgation of the moral faculties, and a renewal of the defaced image of God; and its moral precepts have an everlasting sanction. And thus does Christian love of God and man become an efficient and abiding principle—not tested by the world, but above the world; yet reaching the life-spring of every virtuous deed, and producing in its season a harvest of good and noble works incomparably more abundant than have ever risen from any other soil.

The utilitarian scheme starts, on the contrary, with an abrogation of the authority of conscience—a rejection of the moral feelings as the test of right and wrong. From first to last, it is in bondage to the world, measuring every act by a worldly standard, and estimating its value by worldly consequences. Virtue becomes a question of calculation—a matter of profit or loss; and if man gain heaven at all on such a system, it must be by arithmetical details—the computation of his daily work—the balance of his moral ledger. A conclusion such as this offends against the spirit breathing in every page of the book of life; yet is it fairly drawn from the principles of utility. It appears indeed not only to have been foreseen by Paley, but to have been accepted by him—a striking instance of the tenacity with which man ever clings to system, and is ready to embrace even its monstrous consequences rather than believe that he has himself been building on a wrong foundation*.

Utilitarian philosophy and Christian ethics have in their principles and motives no common bond of union, and ought never to have been linked together in one system: for, palliate and disguise the difference as we may, we shall find at last that they rest on separate foundations; one deriving all its strength from the moral feelings, and the other from the selfish passions of our nature. Religion renounces this unholy union; and the system of utility standing by itself, and without the shelter of a heavenly garment not its own, is seen in its true colours, and in all the nakedness of its deformity.

It has indeed been said that all men are governed by selfish motives, and that a Christian differs from a worldly man only in acting on a better calculated selfish rule. I hope that no one whom I am now addressing has been for a moment imposed upon by such flimsy sophistry. The motives on which man acts are not less varied than the faculties of his soul; and to designate them by one base name (even if done honestly) would only prove an utter confusion of thought or a helpless poverty of language.

---

* The following are the passages here referred to:

"The Christian religion hath not ascertained *the precise quantity of virtue* necessary to salvation."

"It has been said, that it can never be a just economy of Providence to admit one part of mankind into heaven, and condemn the other to hell; since there must be very little to choose between the worst man who is received into heaven, and the best who is excluded. And how know we, it might be answered, but that there may be as little to choose in their conditions?" *Moral Philosophy*, Book 1. ch. 7.

In the latter years of his life Paley would, I believe, have been incapable of uttering or conceiving sentiments such as these.

If we adopt, as some have done, the notion of absolute moral necessity, we destroy the very foundation of morality: for every moral system, in implying responsibility, implies also, at least to a certain degree, the liberty of choice between right and wrong. By the long-continued commission of sin, a man may, however, forfeit the power of self-control—may lose the highest prerogative of his nature, the liberty of soul and body. In such a condition he is said, in the emphatic language of Scripture, to be *given up to a reprobate mind*—to be *in the bonds of iniquity.* But no one comes from his Maker's hands in this condition—he gradually sinks into it by a series of voluntary acts for which he has himself to blame, and of which he bears within his bosom the accumulated evil.

The determination of the human will has ever been considered a dark and difficult subject of inquiry. One cause of this may be, that it takes place more by passion and affection than by reason; and we should be almost justified in affirming, that the will is never determined by reason only, unless some affection be superadded *. But this destroys not the sanctity of moral rule; for we are clearly as responsible for the exercise of our passions and affections as for the other faculties of our nature. Whatever may be the clouds first raised by the subtilty of man, and still hanging over certain moral questions, practically we feel that we are free; and

---

* Locke affirms (*Essay on the Human Understanding*, Book II. chap. 21,) that "the motive for continuing in the same state of action, is only the present satisfaction in it: the motive to change, is always some uneasiness:" and consistently with this opinion he goes on to state, "that the most pressing uneasiness naturally determines the will, when man is distracted with different desires." Here is a fallacy of like kind with that which has led men to resolve all motives into selfishness. Uneasiness, mental or bodily, is a *powerful motive* in determining the will, but it is not the *only motive.* The passion of maternal love which urges a mother to caress and protect her child, is surely a feeling very different from the pain which induces a child to withdraw its finger from the flame of a candle. To describe the two feelings by the same term *uneasiness*, tends only to confusion both of

thought and word. If the doctrine of Locke be true, a man is in a state of absolute moral necessity—a conclusion, I think, directly contrary to reason and to our own experience.—Again; the doctrine, even in extreme cases, is not true. A man of courage will sometimes endure the protracted torture of a surgical operation without flinching. But no one will, surely, say, that the remembrance of past suffering, or the hope of future good, is at the moment a more intense uneasiness than the pain inflicted by the surgeon's knife. In such a case the will is determined by the hope of future good, and directly against the impulse of present uneasiness.

Locke saw clearly that the will is not generally determined by reason pointing out to us the greatest positive good: and he was thence led to the theory above stated; which, however inadequate to explain all the active principles of our nature, has in it much truth; and ought to have modified several of the opinions advanced in the latter part of his work. (Book IV. chap. 17, 18, 19.) Describing the different grounds of assent, he well distinguishes reason and faith from each other. "Reason is natural revelation, whereby the eternal Father of light communicates to mankind that portion of truth which he has laid within the reach of their natural faculties. Revelation is natural reason enlarged by a new set of discoveries communicated by God immediately; which reason vouches the truth of, by the testimony and proofs it give that they come from God." Faith, according to the same author, is the assent to any proposition, coming directly from God in the way of revelation. But he forgets that religion is a rule of life, and that faith is worthless unless it influence the will: yet, on his own system, the will is never determined by a mere perception of the greatest positive good. In short, whatever practical view we take of human nature, faith, in the sense in which the word is used by Locke, is of no value unless there be added to it some of that very element of assent which he condemns under the name of enthusiasm. Without the co-operation of the affections, the influence of Christian rule would soon be extinguished within the bosom—would go out like fire in a damp vault for want of the vital air of heaven to keep it burning. I have thought it right to point out this inconsistency, because it involves consequences of great importance: and the chapters last referred to are written with an energy and spirit most captivating to the judgment of young minds.

the judgment of conscience declaring to us that we are responsible for our deeds, is recorded in the language and institutions of every civilized nation in the history of the world. If this does not satisfy the metaphysician, it is at least enough for the Christian moralist, whose rule of life is simple, and whose light is clear.

Leaving, however, all dark questions connected with the determination of the human will, let us for a moment consider men as they are, and the obvious motives of their actions. However they may differ in the natural strength or cultivation of their individual powers, there are the same essential elements in all; and morally speaking, one man seems to be distinguished from another only by the direction and expansion given to his innate faculties, and the governing power he has gained over them. We see one obeying the movements of brute passion—habitually disregarding others, and seeking only his own sensual gratification. In calling such a one selfish we use a term of unqualified reproach; and he stands convicted, not merely by our own moral judgment, but by the recorded sentence of every age and country. Another may be selfish in a different way. He may seek some end his natural feelings and his reason pronounce to be good; but he seeks that end immoderately, and without reference to the well-being of his fellow-men. Such a man is called selfish, when we estimate his life by that perfect rule which tells him to love his neighbour as himself; or even when we try his motives by the humble standard exhibited in the conduct of the world; and in the latter case, though the word selfish be used only in a relative sense, it is still adopted by us as a term of reproach.

But if selfish passions have exercised a predominating influence over the conduct of mankind, there are other motives in our moral nature, leading to acts of self-denial, and to ends connected only with the good of others. Benevolent affection—a desire for the well-being of others—is a natural feeling of the soul, and even the basest of mankind will sometimes manifest its partial influence. It comes not solely by teaching, for it is perhaps first seen as a mere animal instinct: neither is it the fruit of reason or calculation; for however choked it may be, in common cases, by our baser passions, and kept down by motives returning only into self, it sometimes becomes a strong predominating feeling, leading us into acts contrary both to reason and our worldly interest. Can we then, without a gross abuse of words, confound acts originating in benevolent affections, with those that spring from brute passion or the lust of worldly gain? Cruelty and pity, selfishness and generosity, are words in the vocabulary of every tongue; and are placed there only because they are wanted in the interchange of thought, and in the description of what is ever before us in our commerce with mankind.

All the phenomena of the material world originate in laws of nature, acting either singly or in combination: but to designate all these laws by one name, so far from contributing to philosophic clearness, would prove in us an utter confusion of thought, and an incapacity for understanding the use of general terms.—So also in the immaterial world, the determination of the will takes place in accordance with the laws of man's moral and intellectual nature, and his actions correspond with the passions and affections working within his bosom. But if the actions of man exhibit all the shades of character recorded in written language—then also must the passions and affections be as varied; and to designate them all by one name (hitherto defining only what is base and sordid), would, I think, argue a distorted view of human nature, arising out of moral obliquity or judicial blindness.—A utilitarian philosopher acts wisely, indeed, in hiding the deformity of his moral code by confounding the distinctions between right and wrong: and should his system ever triumph in society, it can only be by defacing the beauty of language, as well as by destroying the moral dignity of man.

How a Christian can resolve all actions into the effects of mere selfish passion, is more than I can comprehend. The Head of our Church, while he had the form of man, showed not in one act the element of selfish feeling. The love of man was the principle of his life—the beginning and the end of his ministration. Are we not told to *walk even as our Saviour walked*—to make his example our rule of life? And is it not true, that the Apostles of our religion, warmed by the spirit of their Master, went about doing good—spent their lives in works of self-denial, recommending themselves as ministers of Christ, *by pureness, by knowledge, by long-suffering, by kindness, by the Holy Ghost, by love unfeigned, by the word of truth, by the power of God, by the armour of righteousness on the right hand and on the left**? To call such men selfish, is to desecrate our language, to blind our moral sense, and to insult all the better feelings of our nature. A man may be saved from the commission of crime through fear—he may do his duty through the hope of reward—but, as the will is ruled mainly by the affections, he cannot go on consistently in the right way unless they be enlisted on the side of his duty: and until he reaches that condition, he is not for one moment in a state of safety, nor do his principles resemble, even in degree, those exhibited by the high examples of Christian love.

---

* 2 Cor. vi. 6, 7.

Coming down, however, to men as seen in common life, we find that selfish passion too often triumphs over all their better feelings, and desolates the moral aspect of the world. There is no fear that they will ever be too kind or generous: now, at least, all fear is from another quarter. Still it is not true that they act exclusively on a selfish rule. They cannot destroy all those kindly elements of their nature which lead them to mingle their own happiness with that of others. In ordinary cases they act on mixed motives; and their practical standard of right and wrong is the opinion of their fellowmen. No wonder that worldly minds should take their rule of life from the world's opinion. And how operative this rule is upon the human heart, may be seen in the patient endurance of the captive savage on the bed of torture—in the courageous acts of which even vulgar minds are capable when hurried on by the applauding sympathy of those around them—in the fantastic but highminded chivalry of the middle ages—in the heroic deeds of self-devotion adorning the history of Greece and Rome. Sentiments of honour, founded on opinion, have ever been among the living springs of national glory—and should any one doubt their power in our days, he has only to reflect, how often the love of life, the suggestions of conscience, and the hopes of the favour of God, have all been swept away before them.

Let me not be misunderstood; I am not commending the law of honour as the rule of a Christian's life, I am only speaking of its power: and while its power exists in society, it is of the utmost consequence that its rule be as elevated as is compatible with its worldly nature. Whatever exalts the national sentiments, and extends the dominion of conscience by working on the better feelings, must practically influence the moral judgments of mankind, and tend to purify the law of opinion. The indirect influence of the religion of Christ has been in this respect of inestimable value. It has banished slavery from our houses, thrown a charm over the relations of social life, taught us to abhor, and hardly to name, crimes against society once perpetrated in the light of day, and thrown a thousand links about the bad passions of men, who neither feel its sanction, nor for one moment think of it as a law proclaimed for their acceptance by the mouth of the Almighty. And thus it is that the law of honour, however false and imperfect as a rule of life, has been exalted and purified by the law of God.

If the poet's song inflamed, and the funeral oration sanctified, the heroic courage of the citizens of Greece and Rome, they were taught also to believe in the supremacy of conscience, and to regard vice as a violation of the law of their moral nature. A lofty standard of right and wrong was ever set up before them; and, however corrupt their practice, virtue was honoured at least in word, and was never permitted to pass before their view without its fitting eulogy.

The law of God is indeed written in the heart in characters too plain to be easily misunderstood; and hence, unless when fettered by system or blinded by passion, men have seldom wandered far from the truth in their speculative judgments between right and wrong.—*Whatsoever things are true, whatsoever things are honest, whatsoever things are just, whatsoever things are pure, whatsoever things are lovely, whatsoever things are of good report; if there be any virtue, and if there be any praise, think on these things**. This is the language of St. Paul—a man quite as deeply impressed with a conviction of the depravity of our nature as the other Apostles; and in fervent zeal and knowledge of mankind superior to them all. Yet does he never shut out the better feelings of the heart—strip us of our power of natural judgement between right and wrong—or put aside the authority of conscience. Still less, in speaking of things honest and just and pure and lovely and of good report, did he for a moment fix their price by a standard of utility, or estimate their worth by any reference to mere worldly good.

Utilitarian philosophy, in destroying the dominion of the moral feelings, offends at once both against the law of honour and the law of God. It rises not for an instant above the world; allows not the expansion of a single lofty sentiment; and its natural tendency is to harden the hearts and debase the moral practice of mankind. If we suppress the authority of conscience, reject the moral feelings, rid ourselves of the sentiments of honour, and sink (as men too often do) below the influence of religion: and if at the same time, we are taught to think that utility is the universal test of right and wrong; what is there left within us as an antagonist power to the craving of passion, or the base appetite of worldly gain? In such a condition of the soul all motive not terminating in mere passion becomes utterly devoid of meaning. On this system, the sinner is no longer abhorred as a rebel against his better nature—as one who profanely mutilates the image of God: he acts only on the principles of other men, but he blunders in calculating the chances of his personal advantage: and thus we deprive virtue of its holiness, and vice of its deformity; humanity of its honour, and language of its meaning; we shut out, as no better than madness or folly, the loftiest sentiments of the heathen as well as of the Christian world; and all that is great or generous in our nature droops under the influence of a cold and withering selfishness.

---

* Philip. iv. 8.

Were it true, that as we grow up to the stature of manhood we cast behind us our passions and affections—that the judgment determining between right and wrong, and the will carrying us into action, are but the measured consequences of abstract reason pointing to us the greatest good; then might the system of utility have some claim to our acceptance. But this is not our moral nature. Our will is swayed by passion and affection: and if we suppress all the kindly emotions which minister to virtue, do we thereby root up the bad passions that hurry us into crime? Incontestably not. On the contrary, we destroy the whole equilibrium of our moral nature, giving to the baser elements a new and overwhelming energy—*we sow the wind and reap the whirlwind*—we unchain the powers of darkness which, in sweeping over the land, will tear up all that is great and good and lovely within it, will upset its monuments of piety, and shatter its social fabric into ruins; and should this hurricane be followed by a calm, it will be the calm of universal desolation. These are no ideal evils. The history of man is too often but a sanguinary tale of the devastations produced by the licence of bad passion.

It is notorious that no man acts up to the pure rule of his religion—that many are indifferent to it, or openly deny its sanction. In examining the effects of the utilitarian philosophy, we have no right to bind up its maxims with the book of life, thereby producing an incongruous system, offensive alike to sound philosophy and true religion—we must try it among men acting on worldly principles, and knowing no higher sanction than the current sentiments of honour: and, not appealing to extreme instances, but taking men as they are, it may, I think, be confidently stated, that the general acceptance of Paley's moral rule in any Christian society, would inevitably debase the standard of right and wrong. It strikes indeed at the very root of the higher virtues which in the past history of mankind have ever been held up to honour, as the strong bonds of social happiness, and the foundation of national greatness. And while human nature is what it is, every system that is sterile in great virtues will be fruitful in great crimes. On this truth history is but a continued comment.

If we accept a system of philosophy which looks on actions only as the means to obtain a worldly end, have we not cause to fear that the end will be made to sanctify the means; and that sensual sin, in its most hideous form, will be endured, or perhaps impudently recommended, as a counterpoise to the evils that are wound about our nature, and enter into the very elements of a condition of probation? Have we not cause to fear that private virtue will, before long, be set at nought, or sink under the domination of universal selfishness—and that, in the prevailing disbelief in individual honour, public men will become the mere implements for carrying into effect the basest aims of faction? In such a degraded state of public opinion, bad, unscrupulous, and boasting men may be elevated to places of high authority; and in their hands the fountains of law and justice may become polluted—the sacred cause of liberty bartered or betrayed—and the national faith sacrificed to vanity, to personal interest, and to party violence. When once sunk to this condition, a nation has parted with the materials both of its strength and glory—the very elements of its cohesion are passing away: and should there not be found ten just men within it to turn away the avenging wrath of heaven, before long its high places will be laid low, and *its pleasant land will be laid desolate.*

The moral system of utility resolves virtue into a single principle, from which our social duties are all to be evolved as a rational consequence. This simplicity (constituting in truth the greatest fault of the system) gave it a ready acceptance in society: for however impatient man generally is in tracing the unascertained connexion of phenomena, he is never wearied with following out the consequences of an hypothesis. In the latter case his natural pride is flattered—he stands forth not as a humble seeker after truth, but as a dispenser of the laws of nature—and he looks on every conclusion he deduces from his principles, as his own intellectual progeny, to be supported by him at whatever cost.

If a rash spirit of generalization have often retarded the advance of physical science, its consequences are incomparably more baneful in moral reasoning. A false theory in physics affects only our views respecting the connected properties of dead matter; and may be set right, sometimes by a single experiment. But moral theories have no simple *experimenta crucis* whereby their truth or falsehood may be tested; and in their application they may effect the social dignity and the happiness of millions, each gifted with an immortal nature. I am not fighting with ideal evils. Who has not witnessed the effects of false principles carried into the social system? In severe science a *reductio ad absurdum* drives us at once from a false position. But in moral and political reasoning, a man must be a pitiful advocate whose breast is not hardened against such a weapon, and who, in defending his theory, is not ready to bear up against its most preposterous consequences.

False opinions on moral questions are then not mere idle aberrations of the mind: for they produce a direct, and sometimes an overwhelming, influence on the practical judgments of mankind—on all the maxims of society by which men are generally governed. Not, however, to dwell on the strange errors in modern moral speculations, we may, I think, conclude that utilitarian philosophy, wherever it is received and acknowledged, will teach man to think lightly of the fences the God of nature has thrown around him, and so prepare him for violent and ill-timed inroads on the social system, and for the perpetration of daring crimes.

To return once more to the questions with which I started; I think that to reject the moral sense is to destroy the foundation of all moral philosophy—that the rule of expediency, as stated by Paley, is based in false reasoning on the attributes of God—that the rule itself is ill-suited to the capacity of man—that it is opposed to the true spirit of the Christian religion—and that, however honestly it may be accepted, it tends inevitably to lower the standard of what is right and good. Lastly, we may, I think, assert, both on reason and experience, that wherever the utilitarian system (avowedly based on a rejection of the moral feelings, and an abrogation of the law of conscience) is generally accepted, made the subject of *à priori* reasoning, and carried, through the influence of popular writings, into practical effect; it will be found to end in results most pestilent to the honour and happiness of man*.

Having examined at so much length the doctrine of expediency, considered as the foundation of moral right, I shall not dwell long on its application to questions of political philosophy, especially as these subjects form so small a part of our system of academic instruction. I may however remark, that as every state is but an assemblage of individuals, each of whom is responsible to moral law, the state itself cannot be exempt from obedience to the same law: and hence if expediency be not (as I have endeavoured to shew) the general test of right in abstract questions of morals, neither can it be the general test of right in questions of political philosophy.

"Right is consistency with the will of God:" and strange must be our notions of the attributes of the Godhead if we can suppose individual and national right to be essentially different from each other. We believe that a nation's honour is a nation's strength; that its true greatness consists in the virtue of its citizens; and that the decay of principle and the frequency of crime are the sure preludes of its downfall. Truths like these are attested by every chapter in the written history of our race: and what do they prove, except that God is a moral governor of the world; and therefore, that in the end high principle and sound policy will be found in the strictest harmony with each other? If in the probationary condition of the world, nations, as well as individuals, be sometimes involved in calamities they seem not to deserve, we have no right on that account to argue from an exception to a rule, or to deny a general truth, attested at once by the voice of history and the repeated declarations of the word of God.

---

* See Appendix, Note (H).

But if principle and policy be thus in general accordance, may we not admit expediency as the basis of political right? I reply, incontestably not. All the objections urged against the utilitarian principles of moral philosophy apply with threefold force in questions of national policy: and for this reason among many others, that men, acting for the state with a divided responsibility, have generally a less elevated standard of right than when acting for themselves. Were utilitarian philosophy ever practically recognized among the leading nations of Europe, bodies of men, already base and sordid, would become more base and more sordid, under the shelter of pretended principle; and national faith and honour would soon be banished from the world in the public contests of unblushing selfishness.

I have before remarked that, as a matter of historical experience, religion is essential to the social happiness of man, and consequently to the well-being of every nation. The Christian religion is however of national importance not merely because it is expedient, but because it is true; and because its truths are of an overwhelming interest to every individual member of the state. It is not my present object to speak either of the proofs or the doctrines of our religion; but I may point out, by the way, its humanizing influence on the whole complexion of society. The life and happiness of a fellow-being is, in a Christian's eye, of a thousandfold more consequence than in the cold speculations of infidel philosophy.

If there be a superintending Providence, and if his will be manifested by general laws operating both on the physical and moral world, then must a violation of those laws be a violation of his will, and be pregnant with inevitable misery: and if it be forbidden to man to "do evil that good may come;" for like reason it is forbidden to a nation to seek any end, however great and important it may seem, by evil means. Prudence is however a virtue in private life; and a wise regard to utility is indisputably the duty of a state. Truths like these are denied by no one: all we contend for is—that the maxims of utility must ever be held subordinate to the rules of morality and the precepts of religion. And to what does this conclusion lead us? Only to refer all right to the supreme authority—to look to the will of our lawgiver as our ultimate rule—and to believe that nothing can, in the end, be expedient for man, except it be subordinate to those laws the author of nature has thought fit to impress on his moral and physical creation.

If in moral reasoning it be mere mockery to use the language of demonstration, and to build up systems by trains of *à priori* reasoning upon a single principle: it is assuredly not less absurd to affect the forms of inductive proof in political speculation. Every political, as well as every moral principle, practically involves the determination of the will, and thereby becomes at once separated from that class of investigations in which we consider the immutable relations of physical phenomena. That the will is influenced by motives, no one pretends to deny—on that subject enough has been said before: but to compare that influence to a physical cause, followed by an unvaried physical effect, is only to confound things essentially different, and must ever end in metaphysical paradox or practical folly.

Again, discussions on the principles of government are not merely removed from the province of demonstration, but are encumbered with difficulties, peculiarly their own, arising out of the blindness of party spirit or the violence of bad passion. We may argue on the powerful influence of the social affections—we may assume, as a general truth, that man is sufficiently watchful of his worldly interests—we may deduce conclusions from our principles, not as mere abstractions (in which case they would be little worth), but as results founded in long experience and fortified by numerical details: yet with all this, which may be called an extreme case of moral certainty, do we find men ready to accept our conclusions? Do we not find, on the contrary, that their eyes are shut to every gleam of light not reflected from their own preconceived opinions—that the small voice of truth cannot be heard amidst the brawlings of faction—and that reason is compelled to hide her head among the contentions of vulgar passion?

Nor have we yet done with difficulties in the application of abstract political principles. Men are commonly ruled by habit and affection. The love of our friends and of our native land—the love of the institutions under which we have been trained, and which, in common cases, give to the mind its whole stamp and character—a feeling of participation in our country's glory—a veneration for forms of government that are blended with historical recollections:—sentiments such as these are honourable and natural to man; and without them, no one, considered as a member of the state, could be a good citizen; nor, as an individual, could he possess either social happiness or moral elevation. Without these feelings, laws would be no more binding than a rope of sand, and the complex and artificial fabric of society would lose its best principles of cohesion, and soon crumble into its first elements.

It is not true that national habits and sentiments are merely the fruit of reason, or that they become confirmed only through an experience of utility. We might, perhaps, assert that they are most inveterate when they are least reducible to any rules of abstract reason. Is it not true, that in the Eastern world many centuries and dynasties have passed away, while social institutions, and habits of thought, to European eyes the most strange and fantastical, have continued to flourish in full ascendency, as if exempt from that power of time which changes all things else? In the great Christian families of Europe, similar institutions, and a common religion, have put men more nearly on the same level, and hindered the growth of strongly contrasted national sentiments. Still, whatever be his external condition, there will remain the same original principles in the inner man;

and we know, not merely from the evidence of times past, but from the experience of our own days, that civil institutions are not commutable—that a form of government, securing peace and happiness in one country, may be followed by anarchy and misery in another—and that sudden changes in any part of the social system, whatever may be their ultimate advantage, are always accompanied by enormous evils. The axe of the despot, or the sword of the conqueror, may have sometimes succeeded in lopping off all national sentiments and cutting men down to a common type and pattern. But such a change implies the destruction of every germ of freedom and national honour: it can only be introduced under the dreadful symbols of servitude, and is the sure prelude of misery and moral degradation.

To what then are we led by considerations such as these? To the belief, that all systems of political philosophy based on the doctrines of utility, and deduced by *à priori* reasoning from assumed simple principles (without comprehending all the great elements of man's moral nature, and without, perhaps, even regarding his social condition), are either mischievous or impracticable. Universal systems, like universal nostrums, savour more of political quackery than political philosophy. They are nearly akin to that system of morals which resolves virtue into general benevolence, while it sets at nought the domestic and social affections: and should they hereafter be found applicable to the government of any portion of mankind, it can only be where men have parted with those sentiments and feelings which have hitherto supplied the firmest cement of social happiness and national strength.

In mechanical philosophy we may make what hypotheses we please; we may theoretically construct an arch, without considering the friction of its component parts, and obtain results, which (however unlike any thing found in a natural condition of equilibrium) are mathematically true, and are not without their speculative use. But political philosophy, in this abstract form, has no certainty and no value of this kind. Its objects are essentially practical; and it must be applicable to some real condition of society, or it is worse than nothing. And most strange and mischievous is that philosophy, which, in considering the stability of a state, overlooks that moral friction whereby its social elements are kept in their true position.

Perhaps it may be said, that the preceding observations are mere truisms denied by no one. But, practically, they have too often been contradicted or overlooked; and more, I believe, in modern than in ancient times.

A wide examination of such facts as throw light on the statistical history of mankind, and a laborious observation of the causes regulating the accumulation and distribution of national wealth, are among the circumstances by which modern political philosophy has been most distinguished: and as we believe that the knowledge of truth will always, in the end, minister to the honour and happiness of man, we must, as honest lovers of our neighbour, rejoice in the progress of economical science. The economist is mainly employed in observing and classifying phenomena, from which he deduces consequences that are to him in the place of moral laws. The legislator, on the contrary, assumes the principles he carries into action, applies them to a given condition of society (perhaps never contemplated by the economist), and anticipates the results of moral causes working on new social combinations. Under this view the position of the two philosophers is seen in the strongest contrast. The one, like the early observers of the heavens, marks the phenomena out of which he endeavours to trace the relative position and movements of the great bodies of the social system. The other, more like the physical astronomer, not merely takes for granted all the great movements of the political fabric; but combining with this a knowledge of the perturbations proceeding from the mutual actions of its parts, dares to look into futurity, and to speculate on events, that time may hereafter bring to light within the world he contemplates. The labours of the one belong chiefly to the elements of political philosophy, the labours of the other belong to its consummation.

The great objects, with a wise legislator, are the security of the state and the happiness of its subjects. But national wealth (in however extended a sense the term may have been used) is, after all, but one of the means of securing these great ends. And among the greatest blunders the economist has committed, has been a hasty spirit of generalization (and what infant science has not suffered by that spirit?), an affectation of deductive reasoning, and a rash attempt to usurp, before his time, the chair of the lawgiver. Political economy has, however, now a permanent place among the applied moral sciences, and has obtained an honorable seat in most of the academic establishments of the civilized world. Surely then we may dare to hope (without being accused of rashness in counting on the coming fortunes of mankind), that it may, in the end, assist in enabling men to see more deeply into the sources of social happiness or national greatness—that it may allay the bitterness of national animosity; teaching kingdoms, as well as individuals, how much they gain from mutual support and mutual good-will—and, more than all, that it may (when combined with Christian knowledge) help to lighten the pressure of such evils as belong to our fallen nature, and are among the unavoidable conditions of our probation.

No one denies that the moral and political characters of men are in a great measure formed by the institutions under which they live; and were it asked, whence these institutions derive their permanency and power; we might reply in general terms—only from being well fitted to the social condition of the state. But if we take a historical view of this great question, we shall see more deeply into the origin of national sentiments. We shall generally find that national character has not been formed merely by national institutions; but on the contrary, that the institutions themselves (so far as they are peculiar and permanent) have for the most part taken their original form and impress from the moral condition of the state—that they have grown with its growth—that they have (like the external covering of the bodily frame) been secreted from its life-blood—and that they are the representatives of opinions and feelings called into being from time to time, and too often during successive ages of conflict and struggle. Happy is that country which is rising in the moral scale of nations, and where the constitution contains within itself a provision for the perpetual adaptation of its institutions to the healthy movement of the state! Laws, like those of the Medes and Persians, which alter not, must soon be followed by premature decay, by secret crimes, or bloody revolutions—the sure attendants of unbending despotism.

Lastly, before I quit the subject of political philosophy, let me endeavour to impress upon you the great truth, that no human system can bring the rebellious faculties of man under the law of obedience; and that no external change of government whatsoever can make him even approach toward a state of moral perfection—an idle dream of false philosophy, contradicted by all the records of mankind, and directly opposed to the word of God. In the latter part of last century there existed a large body of men calling themselves philosophers, the best of whom (as they were seen in a neighbouring kingdom) might be described under the name of *moral fanatics:* for with all the evils they helped to bring upon the world, they still dreamt of doing good. In the internal goverment of the kingdoms of Europe they saw enormous evils; sufficiently accounting, on their theory, for all the wickedness and misery they saw around them. Hence, they sought not merely to improve, but to re-model the whole social fabric of the world; and they looked forward to a time of moral perfectibility, when the image of philanthropy was to be set up in the high places of the earth, and *all the people, the nations, and the languages, were to fall down and worship it.* Unhappily for themselves and for their country, the leaders of this school of fanaticism were, almost without exception, sunk in infidelity. Had they accepted, even in the humblest degree, the doctrines of the religion of Christ, they never could have made such portentous errors in estimating the moral character of man. With all the sanctions of religion, the terrors of the law, and the numerous links thrown round him by the domestic and social affections, how hard is it to keep him in the right way! And if we free him from these complicated bonds, there is nothing left for him but the base servitude of brutal and selfish passion.

Errors like those just pointed out are not perhaps likely ever to rise again into political importance, although they may long continue more or less to taint the speculations of one school of moral and political writers.

Having now glanced over the course of your academic studies, let me endeavour shortly to give this discourse a more personal application. I need not tell you, that your high privileges imply corresponding duties—I need not call upon you by the love of honour and the fear of shame—by the duties you owe to yourselves, to your country, and your God, to buckle on your armour while yet you may, and to be prepared at every point, before you go into the world, and enter on those fields of conflict unto which hereafter you may be called. Topics like these are felt by every soul not sunk in sloth and sensual sin; and by generous natures, like those I am now addressing, perhaps the only fear is, that they should be felt too much.

But there still remains untouched another subject, which, by the laws of our foundation, is the end of all our studies. To enter on the subject of sacred learning at any length is foreign to my purpose; and I have a right to take for granted that I am speaking to Christian men instructed in the record of their religion—believing in its authority—and acknowledging its sanctions. Are then our lives and affections in accordance with the religion we profess and the high privileges we enjoy? Let every one put this question to himself—let him look into his innermost soul by the light of the word of God, and his own conscience will find the proper answer for him. *Though I speak with the tongues of men and of angels, and have not charity, I am become as sounding brass or a tinkling cymbal. And though I have the gift of prophecy, and understand all mysteries and all knowledge; and though I have all faith, so that I could remove mountains, and have not charity, I am nothing...Charity suffereth long and is kind; charity envieth not; charity vaunteth not itself, is not puffed up, doth not behave itself unseemly, seeketh not her own, is not easily provoked, thinketh no evil; rejoiceth not in iniquity, but rejoiceth in the truth; beareth all things, believeth all things, hopeth all things, endureth all things**. If our conscience reply that such is our temper, it is well with us. But if, on the other hand, we find lurking within us a spirit of pride, of bitterness, of intolerance, of harsh judgment, of party-spirit, and of other feelings the very opposite to those described in this most touching passage of St. Paul; then, whatever be our condition and our attainments in the wisdom of the world, we are outcasts from the flock of Christ, and have no inheritance in his kingdom.

Learning, almost beyond that of man—a happy power in tracing out the proofs of natural religion—a critical knowledge of the word of God—a grasp of the sharpest weapons of polemical theology, may coexist in a mind manifesting hardly one single Christian grace: nay, hardly performing the most vulgar acts of moral obligation, enjoined, between man and man, by the sanction of the law, and without which the very frame-work of society could not be held together. I will not however dwell on any extreme case like this, but appeal once more to your own experionce. We have capacities for the perception of moral truth; we know the difference between right and wrong; we naturally approve the one and contemn the other; and our natural perceptions are cleared and elevated by the light of Christian truth: our duty is plainly pointed out, and enforced by the most awful sanctions. Nay, more than this; while removed from the influence of temptation, we wish to obey the word; we wish to walk in the paths of the great and the good: and yet we are infirm of purpose, and cannot do what our heart approves and our conscience dictates.

---

* 1 Cor. xiii.

The sensualist surrenders his liberty to base appetite; binding day by day fresh fetters about his limbs, till they have no power of movement. His course of life is often followed by judicial blindness: his mind loses its upright attitude, and becomes tortuous, because it finds no rest; and he casts about his soul the mist of scepticism to keep off that light of truth his eyes cannot endure. A religion without power over the heart is deprived of its best evidence; and hence he learns to doubt the truth of a system of which he feels not the benefit, and to turn away from that doctrine by which his own life is condemned. A character like this is of no unfrequent occurrence in the ordinary commerce of life.

But I will suppose you sincere believers in the word of God, and not weighed down by the habitual burden of any flagrant sin. Still, if you look into yourselves, you will find that you not only come immeasurably short of the standard set up by the Word of God, but far short of that you could yourselves set up by the natural light of conscience. Thoughts like these must pass through the minds of every reflecting Christian: and, at times, while toiling in his earthly vocation, or even when striving after what he thinks his duty, he will be weighed down with a feeling of self-abasement, and be ready to cry out with St Paul, *Oh wretched man that I am, who shall deliver me from the body of this death?* Religion gives an answer to this question. We have the power of discerning good and evil; this coexists with our natural condition; but the power of acting steadily and undeviatingly on the dictates of conscience, is not given us by nature: and here religion steps in and points out the only remedy for this discordance and confusion in the moral world.

If we be not the basest hypocrites in our religion—if we do not utter within this sanctuary a mere idle form of words, opposed both to the conviction of our reason and the approval of our conscience—then must we believe that there is a superintending Providence who governs the world. To this doctrine we can make an approach, even by the feeble light of natural religion. We must further believe, that for the moral ruin and confusion we see around us God has provided a special remedy, by the sacrifice of his Son; who now sits exalted at his right hand, as our mediator and spiritual head. And, lastly, we must believe, that by communion with this our head (sustained by all the ordinances of religion—by public and by secret prayer), we obtain at once the benefit of this sacrifice, and the covenanted promise of a new principle of life, and a new power of moral obedience. It is by winding itself into our affections—by reanimating the principle of love—that religion has this power. In expelling from the heart its corrupt affections, it leaves it not an open prey to still baser appetites, but fills it with its first and noblest occupants: and thus restores the moral man to his Maker's image and his Maker's favour. It is thus that the religion of Christ does not oppose, but lends support, to all those high faculties that give its only true elevation to the character of man: in proof of which (were there any doubt of what I am stating), we need only cast our eyes over Christendom, and contrast its glories with the intellectual darkness of every land whereon the light of the Gospel hath not yet shone.

Finally, to bring this home to ourselves: we are no true children of our Lord and Master—we are no part of his flock—if we honour him not by the outward forms of allegiance he has himself enjoined; if we seek him not by the way he has himself appointed—by acts of public devotion—by the earnest petitions of private prayer, lifted up to him, not only as the giver of all good, but as the giver of that power by which alone we can root out our corrupt affections, and bring into full life the better principles of our nature. Let, then, prayer be the beginning and the end of our studies; and so they will be consecrated to God. In this way, by his blessing, may we persevere unto the end; treading in the steps before trodden by the great and good men, whose names are the precious inheritance of this house.

Feelings of Christian devotion, unlike ordinary movements of the soul, lose not their strength by repetition: and habits of devotion, like all other habits, gain strength by frequent exercise. But if the habit of secret prayer be suspended, though for a short time, I ask your conscience, whether, during that interval, your moral fences have not been broken down; and whether the spoiler hath not entered in, and committed havoc among some of the best faculties of your inner nature?

Let, then, this ceremonial at which we meet, be an occasion of communion with the living God—let us pray for his protection over ourselves and our household; so that we may all be enabled to walk in the light of truth, and in imitation of the great patterns of Christian life he has vouchsafed to give us. So shall we do our duty to God and man—so shall we be bound together by holy bonds no worldly power can break asunder—and so may we hope that God, as he has done abundantly in times past, will continue, in times to come, to vouchsafe to this Christian family the proofs of his protecting love. *Except the Lord build the house, they labour in vain that build it: except the Lord keep the city, the watchman waketh but in vain.*

APPENDIX.

NOTE (A), p. 15.

THE paragraph here referred to requires no explanation to any one instructed in the first principles of physical astronomy. The following note is therefore addressed exclusively to those who are unacquainted with the severe parts of exact science.

In order to understand the nature and importance of Newton's discoveries, we must remember that, in the preceding century, the Copernican system had been promulgated; and that Kepler, after incredible labour, had established the following general propositions on the evidence of direct observations.

1. That if each planetary orbit be considered as an area traced out by a line drawn from the sun to the revolving body; this line traces out equal successive areas in equal successive times.

2. That the planets move in elliptical orbits, having the sun in a common focus.

3. That the squares of the times of revolution of the several planets and the cubes of their mean distances from the sun, are in a fixed proportion to each other.

It must also be admitted that, before the discoveries of Newton, there was current in the philosophic world a vague and general notion of some material action of the planets on each other. No one, for example, doubted that the tides were some how or other influenced by the moon: and, perhaps no one who had adopted the Copernican system, and speculated on the nature of mechanical motion, could doubt that the planets were affected by some action or power emanating from the sun. Before the time of Newton, no one had, however, ventured to promulgate any definite or numerical law of gravitation; still less had any one, on the assumption of a definite law, demonstrated a single fundamental proposition in astronomy. What had been done by preceding philosophers, takes no more from the glory of Newton, than the predictions of Seneca take away from the honour of Columbus.

If any one anticipated Newton, in the application of the law of gravitation to the system of the Universe, it was Kepler, and not Hook, as has been sometimes erroneously asserted. Hook did not demonstrate a single fundamental proposition in astronomy; and Newton, I believe, preceded him in the very speculations on which his claims have been sometimes set up. For we must remember that Newton, when a very young man, had just notions of the nature of a central force; and that he endeavoured to prove, by calculation, that the moon was held in its orbit by the sole force of the earth's attraction; and failed, only because the distance of the moon had been falsely estimated by practical astronomers. Leaving, however, mere historical discussion, let us consider one or two of the early steps of his philosophic progress.

He first appeared as the improver of the elements of mechanical philosophy, giving the laws of motion a generality they had not before, and extending their application to the investigation of motions arising from the combined action of many forces. Starting, then, with the laws of motion (which, in the first instance, may be regarded as an enunciation of certain material phenomena ascertained by direct experiment), his next grand generalization led him to extend these laws to all the bodies of the solar system: and, combining this assumption with the first proposition of Kepler (above quoted), he at once demonstrated that the planetary bodies are retained in their orbits by a force tending to the center of the sun. Combining this demonstrated truth with the second proposition of Kepler (above quoted), he then went on to prove, by a new and most refined geometry, that the force emanating from the sun must vary inversely as the square of the distance from its center; or, in other words, must diminish in the exact proportion in which the square of the distance increases. Having once established this great truth, he then proved that the third proposition of Kepler was a necessary consequence of the demonstrated law of central force. Nothing can be conceived more perfect than this induction; which, starting with laws ascertained by observation, ascended by successive demonstrations, and proved that the most striking phenomena of the solar system were necessary truths involved in the operation of one single mechanical law.

By a similar train of demonstrative reasoning, Newton proved that the planets act on the several satellites revolving round them according to the same law by which the sun acts on them; and that the moon is retained in her orbit by the same power which, on the earth's surface, brings a heavy body to the ground. Generalizing the truths at which he had so far arrived by demonstrative reasoning, and asserting of gravitation only what was known of its nature by direct experiment at the earth's surface, he proved that the center of each planet may be considered as a distinct center of a force, not primarily impressed upon the center, but derived as a secondary phenomenon from the combined action of every particle composing the planetary mass; and he also demonstrated (with a skill almost supernatural, considering the feeble instruments at that time placed within his hands,) that the irregularities of the moon's motions are necessary consequences of this universal law of material action.

Again, knowing as a matter of fact that the planets are not perfect spheres, he proved that their forms are necessary effects of his own theory: and combining these conclusions with the law of universal gravitation, he proved, by most subtle calculations, that certain irregularities in the annual motion of the earth (producing the phenomena of equinoctial precession) are the necessary consequences of the sun's action on the mass of a spheroidal body.

In tracing out the consequences of the law of gravitation, and explaining the minute secular inequalities of the heavenly bodies, much, no doubt, was left by him unfinished. But he had lighted the way for those who were to follow, had given them the key whereby the mysteries of the kingdoms of nature were to be unlocked, and had laid the foundations of every part of that superstructure which has been since reared only by the united labours of the philosophic world.

The refined geometry of Newton, however beautiful as a mode of exhibiting known truths, is now thrown aside as an implement of discovery. "It was like the bow of Ulysses, which none but its master could bend;" and the difficult questions of physics are now assailed by weapons of greater power*. We must not however forget that he was a great inventor in pure mathematics: and though he had neither made a single optical experiment, nor taken a step in expounding the laws of the material world, he would still have had an exalted place in the philosophic history of man.

Of the theory of universal gravitation, in the form it has at length assumed, it is not too much to say, that it can be changed by no hand but that which first impressed on matter the laws whereby it continues to be governed. Should man be ever permitted to ascend to some higher universal law, binding together the phenomena of light, heat, magnetism, and all the other subtle agents of our system, still no part of the foundations of physical astronomy would be shaken; and the utmost change to be introduced into it would be a trifling modification of the formal language of some of its propositions.

---

* *Discourse on the Study of Natural Philosophy*, by Sir John Herschel, p. 273.

In the following words (taken from the preface of the first edition of the *Principia*) Newton has recorded with great simplicity his own method of arriving at philosophic truth. *Omnis philosophiæ difficultas in eo versari videtur, ut a phænomenis motuum investigemus vires naturæ, deinde ab his viribus demonstremus phænomena reliqua. Ex phænomenis igitur cœlestibus, per propositiones mathematicæ demonstratas derivantur vires Gravitatis, quibus corpora ad solem et planetas singulos tendunt: deinde, ex his viribus, per propositiones etiam mathematicas, deducuntur motus planetarum, cometarum, lunæ, et maris.*

Near the end of his book of *Opticks*, he writes in the same philosophic spirit—" As in mathematics, so in natural philosophy, the investigation of difficult things by the method of analysis ought ever to precede the method of composition. This analysis consists in making experiments and observations, and in drawing general conclusions from them by induction, and admitting of no objections against the conclusions, but such as are taken from experiments, or other certain truths. For hypotheses are not to be regarded in experimental philosophy. And although the arguing from experiments and observations by induction be no demonstration of general conclusions, yet it is the best way of arguing which the nature of things admits of, and may be looked upon as so much the stronger, by how much the induction is more general. And if no exception occur from phenomena, the conclusion may be pronounced generally. But if at any time afterwards any exception shall occur from experiments, it may then begin to be pronounced with such exceptions as occur. By this way of analysis we may proceed from compounds to ingredients, and from motions to the forces producing them; and in general, from effects to their causes, and from particular causes to more general ones, till the argument end in the most general. This is the method of *analysis*. And the *synthesis* consists in assuming the causes discovered, and established as principles, and by them explaining the phenomena proceeding from them and proving the explanations."

The former of these methods, when applied to the investigation of physical phenomena, has long been known by the term *induction:* the latter, in one of the writings of Sir John Herschel, is called the method of *deduction*. This word had nearly been forgotten, but was wanted, and is again becoming current in the language of philosophy.

In the method of analysis and induction Newton stands without a rival in the history of man; whether we regard the boldness and certainty of his generalizations, or the inventive skill by which he linked together truths before his time sterile and unconnected. In the power of deductive reasoning he may perhaps have had some equals; but it must ever be difficult to form any just comparison of the intellectual powers of men labouring during distinct periods in the advance of science.

Deductive reasoning is the consummation of exact science, and its importance is shewn in two ways—First, in deducing from first principles physical truths already known by observation; in which view it not only offers the highest possible confirmation of the principle from which we start, but it assists and perfects the results of observation. Secondly, in deducing consequences hitherto concealed in the unexplored regions of nature. Such were some of the great secular inequalities, and astronomical periods discovered by Laplace—and such (to quote more recent instances) was the conical refraction brought to light by Professor Hamilton, and the modifications of Newton's coloured rings predicted by Professor Airy before they had ever been exhibited by any experimental test. To this list we may now add, the determination (by most intricate and laborious calculations founded on the theory of gravitation) of the place of a new Planet exterior to Uranus, made by Mr. Adams in 1845; and in course of the year following made, independently, by M. Le Verrier, of Paris. These two philosophers, starting from the same principles, arrived by independent methods at the same result; and thereby enabled astronomers to see the new planet by telling them to what spot in the heavens their telescopes were to be pointed. A greater confirmation of the soundness of a theory, or a more striking proof of deductive skill in following out its consequences, is not to be found in the history of exact science*.

It must however be obvious, that deductive reasoning can never have any value, except when we have to do with the laws of fixed and unchangeable elements: without this condition it leads only to the extension and complication of error. In moral and psychological questions (for example) where all the elements are ill defined, the analytic is the only method of approaching truth. Logic may teach us to disentangle sophistry, to marshal our ideas, and to limit our conclusions: but it cannot, without a miracle, draw fixed consequences from unfixed elements. Those who, on psychological questions, have dealt in the forms of deductive proof, have perhaps done the least harm when they have allowed the imagination entirely to usurp the seat of reason. Their works may then amuse and instruct mankind, though not perhaps in the way the authors first intended. But the affectation of the language of synthetic demonstration on moral questions, has, almost without exception, been followed by practical evils; giving rise to a train of shallow reasoners, venders of trifling propositions, or propagators of antisocial paradoxes.

---

* On the effects of inductive and deductive habits of thought on the mind of man, see two very original and beautiful chapters in the latter part of a work published during the year 1833, by the Rev. W. Whewell: *Astronomy and General Physics considered with reference to Natural Theology.*

Note (B), p. 17.

When the great bodies of our system are described as revolving *in vacuo* about the sun, we merely understand by such words, that they revolve in a space offering no sensible resistance to their motions; and even this assumption must now be modified, for the most attenuated of these bodies (the comets) probably meet with a resistance sensibly changing the periods of their return. That Newton did not suppose the existence of an extensive vacuum within the limits of our system, is evident from his speculations respecting the nature of light and the cause of gravitation; and in the tenth proposition in the third book of the *Principia* he gives the following reason for supposing that the motions of the planets may be continued for an indefinite period of time; *si ascendatur in cælos ubi pondus medii, in quo planetæ moventur, diminuitur in immensum, resistentia prope cessabit* *.

We may perhaps make the words this note refers to somewhat better understood by taking an imaginary case. Let us suppose a sentient being sustained in any part of our system, which is not occupied by the grosser matter of the planetary bodies, and endowed with a power of sight as great as is our own when assisted by the best telescope yet invented. To such a being all the bodies of our system would at once become visible, and the firmament around would be seen by him glittering with the light of many million stars. But we must remember that each of these shining points is seen only through the intervention of a beam of light sent down by it directly to the eye. There is, therefore, not a single point in the empty spaces of our system through which millions of beams of light do not pass unceasingly, yet with a material action so subtle that one beam interferes not with another, but each passes onward, as if moving by itself—the sole messenger from the center of light to the sentient beings of the universe.

---

* See also the concluding parts of Newton's *Opticks*, especially *Queries* 18, 19, 20, and 28.

In general considerations like these the mind seems to lose its power, and becomes almost bewildered: and if we call in the aid of calculation, though we build on demonstration and clothe our results in numbers, our conclusions seem, perhaps more than ever, removed from the grasp of sense. If we accept the theory (considered, by some of those who have most deeply studied it, as well established as the theory of gravitation) which derives the sensation of sight from vibrations propagated through an elastic ether, by the visible object to the eye; then is each beam of light but a part of a distinct system of vibrations, every wave of which diverges through space with a sustained velocity sufficient to carry it eight times round the earth in a single second, and each wave is followed by another at so short an interval, that 100,000 of them are packed within the space of every inch. Millions of such systems of vibrations pass, then, unceasingly through every point of visible space, yet without disorder and confusion: so that each system of waves goes on unobstructed by the others, preserving the individual powers impressed upon it, and through them ministering to the wants of millions of sentient beings.

Our knowledge of the complicated fabric of the material universe (even in those parts we sometimes describe as mere vacuities) does not end here. There is not a point in any portion of our system through which millions of material influences (implied indeed in the law of universal gravitation) are not constantly transmitted. That they differ from the subtle material action last considered is certain; yet no one will deny that they belong to some mode of material action, though he knows nothing of the mechanism whereby they are propagated and maintained.

Had there been any extended vacuities in the universe, it might, perhaps, have been said, that such portions of space were without any manifestation of the Godhead. But what has been stated is enough to shew that there are no such places within the ken of our senses or the reach of our thoughts. That God is every where is the language of revealed religion; that God manifests his power every where is, in like manner, the voice of natural religion spoken through the universal domination of material laws.

Considerations like these fill the mind with feelings of the vastness of the power and skill employed in the mechanism of the world; yet of the great Architect himself and of the materials employed by him, they give no adequate notion whatsoever. Still we are (in part at least) permitted to ascend to the laws impressed on matter, and to see how they have been adapted to each other, so as to work together for a common end, and to minister to the wants of man and his fellow-beings; and this is enough for the argument built upon such knowledge.

Truth depends not on authority: but it may be well to fortify this conclusion by two quotations from the latter part of Newton's *Opticks*. "Though every true step made in this philosophy brings us not immediately to the knowledge of the first Cause, yet it brings us nearer to it, and on that account is to be highly valued." Again, he writes, "If natural philosophy in all its parts, by pursuing this method (of analysis and induction), shall at length be perfected, the bounds of moral philosophy will be also enlarged. For, so far as we can know by natural philosophy what is the first Cause, what power he has over us, and what benefits we receive from him; so far our duty towards him, as well as towards one another, will appear to us by the light of nature."

NOTE (C), p. 27.

IN the preceding discourse, as well as in the notes affixed to it, my object is to teach, as far as I am able, the junior Members of the University to think correctly on the more important branches of academic study. The mere building up of knowledge is labour ill-bestowed, if not followed by improved habits of thought. But no man is passive during the acquisition of such habits. They exist only where the best powers of the mind have been steadily employed in their formation. This is a law affecting every human being. Perfection (in the limited sense in which the word can be used in speaking of the feeble powers of man) comes only by continued and well-applied labour: and the remark bears on our moral condition as well as our intellectual.

The studies of mankind have sometimes been divided into natural, moral, and religious. Each branch requires its appropriate training, and yields its own peculiar fruit. A study of the natural world teaches not the truths of revealed religion, nor do the truths of religion inform us of the inductions of physical science. Hence it is that men, whose studies are too much confined to one branch of knowledge, often learn to overrate themselves, and so become narrow-minded. Bigotry is a besetting sin of our nature. Too often it has been the attendant of religious zeal: but it is perhaps most bitter and unsparing when found with the irreligious. A philosopher, understanding not one atom of their spirit, will sometimes scoff at the labours of religious men; and one who calls himself religious will perhaps return a like harsh judgment, and thank God that he is not as the philosophers—forgetting all the while, that man can ascend to no knowledge, except by faculties given to him by his Creator's hand, and that all natural knowledge is but a reflexion of the will of God. In harsh judgments such as these there is not only much folly, but much sin. True wisdom consists in seeing how all the faculties of the mind and all parts of knowledge bear upon each other, so as to work together to a common end; ministering at once to the happiness of man and his Maker's glory.

Again, a man may be skilled in many branches of knowledge; and yet his affections may be wrong-placed and his bad passions unsubdued. Our conduct in each instance in which we are called on to act is mainly determined by the feelings and thoughts excited by the things around us. One man pursues natural knowledge, but soars not in imagination beyond material phenomena. Another sees the indications of design, and perhaps goes on to mark the wise adaptation of the various parts of the material world. A third, while contemplating the world around, thinks nothing of these things; but his imagination takes wing, and his soul is borne away in poetical emotion. A fourth feels with greater or less power what all the others feel, but adds to it a movement of thankfulness to the Giver of all good; and this new feeling, when joined to a firm belief in the word of God, blends itself in the animating principle of Christian love. Contrasts such as these in the emotions of our inner nature while we are under the same external conditions (and every hour's experience shews us examples of them in some form or other), arise from different habits of the soul, whether we regard them as moral, intellectual, or religious. But such habits, I repeat, have been gained only by appropriate training. If they be intellectual, they have been gained by intellectual toil: if religious, they have come only by well-directed religious studies and religious exercises.

After every new combination, the properties of matter are essentially changed, and present a new set of phenomena. It is not, perhaps, too much to say, that, in like manner, after every new act or voluntary thought, the soul is put in a new psychological condition. Its powers of doing or forbearing are changed: for things are ever after present to it in the memory, and brought out by the associating principle, in new intellectual combinations. We know the inveteracy of habits; and it is mainly through the associating principle that they gain their strength. By every fresh commission of sin we lose both the power and the inclination to escape from the bondage of bad passion: for the storehouse of the memory becomes tenanted by images of darkness, mingling themselves with the recollections of past good, and tempting us on in the way of evil. Acts of forbearance done on principle give us, on the other hand, new inclinations and new capacities for virtue. The mind becomes stored with remembrance of moral victories; the associating principle is then the source of happy recollections and good resolves; and above all, the soul is taught to seek for strength where it is to be found—in the fountain of all goodness. And thus a good man learns, at length, to do without effort, and with inward joy, what another, were he to offer the whole world for it, has no power of performing.

If such be the conditions of our being, and such the relations of our thoughts to the things around us, a good training and the commencement of good habits in early life must be matters of inexpressible moment. This is equally true whether, according to the bent of our minds, the question be considered in a metaphysical or a religious point of view. The remark is by no means confined to our intellectual capacities—it applies with fuller meaning to our moral and religious sentiments—to all those feelings of the soul which call our moral powers into visible activity. A philosopher may be cold-hearted and irreligious—a moralist may be without benevolence—and a theologian may be wanting in the common charities of life. All this shews that knowledge is not enough, unless feelings and habits go along with it, to give it its meaning, and to carry it into practical effect. Religion reaches the fountain-head of all these evils; and she alone gives us an antagonist principle whereby we may effectually resist them.

In natural knowledge we may mount from phenomena to laws; but in doing this we are held by fetters we cannot break—we cannot alter one link in the chain of natural causes—we can only mark the traces of an unvarying power, external to ourselves, and to which we are ourselves in bondage. If this be our condition in acquiring natural knowledge, what right have we to think, that in gaining religious knowledge we are permitted to be more free?—that in regard to our spiritual relation to God and a future state we may indulge in any fantastical notions we think fit; while we shut our eyes to the light that he has given us, and despise the law that he has set before us? Madness and folly like this, in any one professing to be a Christian (and to Christians only is this Discourse addressed), would be utterly incredible, did we not see it every moment before us, and did we not find all its elements lurking within our own bosoms.

But if the Bible be a rule of life and faith—a record of our moral destinies—it is not, nor does it pretend to be, a revelation of natural science. The credibility of our religion depends on evidence, internal and external. Its internal evidence is seen in the coherence of its design from its first dawning to the fulness of its glorious light—in its purity and moral dignity—in its exalted motives fitted to call forth man's highest moral and intellectual energies—in its suitableness to his wants and weakness—in its laying bare the inner movements of his heart—in its declarations of the reality of a future state, and of other truths most important for him to know, yet of which he has but a faint and insufficient knowledge from the light of nature. Its external evidence mingles itself in a thousand ways with the internal; but finally resolves itself into the strength of human testimony, proving that God has at many times made a visible manifestation of his power on earth; promulgating among mankind a rule of life, enforcing it by the terror of penal sanctions, and confirming it by miracles publicly wrought in attestation of its truth. Physical science, on the contrary, derives no support from internal evidence or external testimony: but it is based on experiment alone, is perfected by induction, and is drawn out into propositions by a rational logic of its own. To confound the ground-works of philosophy and religion is to ruin the superstructure of both: for the bases on which they stand, as well as their design, are absolutely separate; and we may assume it as an incontrovertible truth, that the inductions of philosophy can be no more proved by the words of revelation, than the doctrines of Christianity can be established by the investigations of natural science.

Should some one ask how men can overlook truths like these after they have been once enunciated? we may reply, that men have often been led into such folly by vanity and arrogance—the one shutting from their senses the narrow bounds of their own ignorance—the other teaching them to contemn what they do not comprehend. Another source of error, on physical questions, has been a mistake respecting the import of certain scripture phrases. These writings deal not in logical distinctions or rigid definitions. They were addressed to the heart and understanding, in popular forms of speech such as men could readily comprehend. When they describe the Almighty as a being capable of jealousy, love, anger, repentance, and other like passions, they use a language accommodated to our wants and capacities, and God is put before us in the semblance of humanity. They tell however what it is essential for us to know—our relations and our duties to him, and the penalties of disobedience: and were it possible for them to make even an approach to the perfections of his glory, no man could by looking on them comprehend their meaning; and they would be at once unfitted to be the vehicle either of religious truth or moral rule. If this principle of interpretation be adopted in numberless parts of Scripture describing the moral attributes of God; we may surely extend it to other passages (unconnected with any religious doctrine, and therefore of comparatively small importance) in which the fabric of the material world is the subject of some passing allusion or figurative illustration.

A philosopher may smile at the fulminations of the Vatican against those who, with Copernicus, maintained the motion of the Earth: but he ought to sigh when he finds that the heart of man is no better than it was of old, and that his arrogance and folly are still the same—that bigotry and ignorance still go hand in hand, and are ever ready to entrench themselves in any lurking-place, whence they may assail with maledictions and words of evil omen all those who are enjoying a light of truth their eyes cannot bear to look upon. There are still found some who dare to affirm that the pursuits of natural science are hostile to religion. An assertion more false in itself, and more dishonourable to true religion, has not been conceived in the mind of man. Of other sciences I am not called on to speak; but having, in this Discourse, (p. 25—28) described some of the general truths brought to light by Geology, I may be permitted to add a few words in its vindication.

The Bible instructs us that man, and other living things, have been placed but a few years upon the earth: and the physical monuments of the world bear witness to the same truth. If the astronomer tells us of myriads of worlds not spoken of in the sacred records, the geologist in like manner proves (not by arguments from analogy, but by the incontrovertible evidence of physical phenomena) that there were former conditions of our planet, separated from each other by vast intervals of time, during which man, and the other creatures of his own date, had not been called into being. Periods such as these belong not, therefore, to the moral history of our race; and come neither within the letter nor the spirit of revelation. Between the first creation of the earth and that day in which it pleased God to place man upon it, who shall dare to define the interval? On this question Scripture is silent: but that silence destroys not the meaning of those physical monuments of his power that God has put before our eyes;

giving us at the same time faculties whereby we may interpret them and comprehend their meaning.

In the present condition of our knowledge, a statement like this is surely enough to satisfy the reasonable scruples of a religious man. But let us, for a moment, suppose that there are some religious difficulties in the conclusions of Geology. How then are we to solve them? Not by making a world after a pattern of our own—not by shifting and shuffling the solid strata of the earth, and then dealing them out in such a way as to play the game of an ignorant or dishonest hypothesis—not by shutting our eyes to facts, or denying the evidence of our senses; but by patient investigation, carried on in the sincere love of truth, and by learning to reject every consequence not warranted by direct physical evidence. Pursued in this spirit, Geology can neither lead to any false conclusions, nor offend against any religious truth. And this is the spirit with which many men have of late years followed this delightful science—devoting the best labours of their lives to its cultivation—turning over the successive leaves of nature's book, and interpreting her language, which they know to be a physical revelation of God's will—patiently working their way through investigations requiring much toil both of mind and body—accepting hypotheses only as a means of connecting disjointed phenomena, and rejecting them when they become unfitted for that office, so as in the end to build only upon facts and true natural causes. All this they have done, and are still doing; so that however unfinished may be the fabric they have attempted to rear, its foundations are laid upon a rock, and cannot be shaken, except by the arm of that Being who created the heaven and the earth—who gave laws to the material world, and still ordains them to continue what they are.

But there is another class of men who pursue Geology by a nearer road, and are guided by a different light. Well-intentioned they may be, but they have betrayed no sufficiency, along with a shameful want of know- [illegible] the fundamental facts they presume to write about: hence they have dishonoured the literature of this country by *Mosaic Geclogy*, *Scripture Geology*, and other works of cosmogony with kindred titles, wherein they have overlooked the aim and end of revelation, tortured the book of life out of its proper me [illegible] and wantonly contrived to bring about a collision be [illegible] natural phenomena and the word of God. The Bugg [illegible] he Penns—the Nolans and the Formans—and some [illegible] s of the same class, have committed the folly and [illegible] of dogmatizing on matters they have not personall [illegible] ined, and, at the utmost, know only at second h [illegible] pretending to teach mankind on points where [illegible] mselves are uninstructed. Authors such as these oug [illegible] have first considered, that book-learning (in whatsoever degree they may be gifted with it) is but a pitiful excuse for writing mischievous nonsense; and that to a divine or a man of letters ignorance of the laws of nature and of material phenomena is then only disgraceful, when he quits his own ground and pretends to teach philosophy. Their learning (if perchance they possess it) has been but ill employed in following out the idle dreams of an irrational cosmogony: and they would be labouring at a task better fitted for their capacity, were they studying the simple and affecting lessons of Christianity, and trying to make its maxims of charity their rule of life.—A Brahmin crushed with a stone the microscope that first shewed him living things among the vegetables of his daily food. The spirit of the Brahmin lives in Christendom. The bad principles of our nature are not bounded by *caste* or climate; and men are still to be found, who, if not restrained by the wise and humane laws of their country, would try to stifle by personal violence, and crush by brute force, every truth not hatched among their own conceits, and confined within the narrow fences of their own ignorance.

We are told by the wise man *not to answer a fool according to his folly;* and it would indeed be a vain and idle task to engage in controversy with this school of false philosophy—to waste our breath in the forms of exact reasoning unfitted to the comprehension of our antagonists—to draw our weapons in a combat where victory could give no honour. Before a Geologist can condescend to reason with such assailants, they must first learn Geology. It is too much to call upon us to scatter our seed on a soil at once both barren and unreclaimed—it is folly to think, that we can in the same hour be stubbing up the thorns and reaping the harvest. All the writers of this school have not indeed sinned against plain sense to the same degree. With some of them there is perhaps a perception of the light of natural truth which may lead them after a time to follow it in the right road: but the case of others is beyond all hope from the powers of rational argument. Their position is impregnable while they remain within the fences of their ignorance, which is to them as a wall of brass: for (as was well said, if I remember right, by Bishop Warburton, of some bustling fanatics of his own day) there is no weak side of common sense whereat we may attack them. If cases like these yield at all, it must be to some treatment which suits the inveteracy of their nature, and not to the weapons of reason. As pyschological phenomena they are however well-deserving of our study; teaching us, among other things, how prone man is to turn his best faculties to evil purposes—and how, at the suggestions of vanity and other bad principles of his heart, he can be so far deluded, as to fancy that he is doing honour to religion, while he is sacrificing the common charities of life, and arraigning the very workmanship of God.

The recent attacks on physical science, and the gross misapprehension of its moral tendency, have been singularly wanton and ill-timed. The living philosophers of this country are a set of sober-minded men, who have betrayed no hostility to revealed truth. An exclusive devotion to one subject inevitably makes a man narrow-minded; and a successful career of intellectual toil may make a man proud and full of self, and so take from him the best graces of a Christian character. But failings like these belong to the infirmities of our nature, and are not confined to any one profession or pursuit: they may be seen in the characters of sagacious lawyers or learned divines, as well as of laborious philosophers. It would, indeed, be ridiculous to say, that all living philosophers are religious men. Like their neighbours, they have their besetting sins: but many of them are firm believers in revelation; and among them may be found some who shine forth as illustrious patterns of Christian life.

A sceptic may, indeed, think that the whole system of things, moral and physical, has no principle of continued rest—that it has only been jostled into a condition of unstable equilibrium, which may be destroyed by the first movement of any of the component elements. Such a one may reasonably fear the progress of discovery; for his system wants the essential principles of cohesion. But a sincere believer in the word of God has no fear of this kind: for he knows that all the parts of the natural world are wisely fitted together—that the Lord of all nature is a being *without variableness or shadow of turning*—and that truth, of whatever kind, as seen in the mind of man, is but a perception of his Maker's will.

A man of deep thought and great practical wisdom—one whose piety and benevolence have for many years been shining before the world, and of whose sincerity no scoffer (of whatever school) will dare to start a doubt—recorded his opinion in the assembly of men of science, who during the past year were gathered from every corner of the Empire within the walls of this University, *that Christianity had everything to hope and nothing to fear* *from the advancement of philosophy*[*]. These are golden words, and full of meaning to those who have wisdom to understand them. But there are some to whom this great assembly has been a topic of offence. They belong to a pyschological class of their own; gifted indeed with very humble powers in following out true consequences, either moral or physical; but compensated, in return, with gifts of another kind. Like birds of bad omen, they can croak of coming ills and smell corruption from afar; and by the powers of a new analysis—a perverted moral alchemy—they can extract evil out of good and dross out of gold.

Another indiscretion (far different however from the egregious follies I have just noticed) has been committed by some excellent Christian writers on the subject of Geology. They have not denied the facts established by this science, nor have they confounded the nature of physical and moral evidence: but they have prematurely (and therefore, without an adequate knowledge of all the facts essential to the argument,) endeavoured to bring the natural history of the Earth into a literal accordance with the book of Genesis—first, by greatly extending the periods of time implied by the six days of creation (and whether this may be rightly done is a question only of criticism, and not of philosophy)—and secondly, by endeavouring to shew, that, under this new interpretation of its words, the narrative of Moses may be supposed to comprehend, and to describe in order, the successive epochs of Geology. It is to be feared that truth may, in this way, receive a double injury; and I am certain that the argument, just alluded to, has been unsuccessful. The impossibility of the task was however (as I know by my own experience) a lesson hard to learn: but it is not likely again to be attempted by any good Geologist. The only way to escape from all difficulties pressing on the question of cosmogony has been already pointed out. We must consider the old strata of the earth as monuments of a date long anterior to the existence of man, and to the times contemplated in the moral records of his creation. In this view there is no collision between physical and moral truth. The Bible is left to rest on its appropriate evidences, and its interpretation is committed to the learning and good sense of the critic and the commentator: while Geology is allowed to stand on its own basis, and the philosopher to follow the investigations of physical truth, wherever they may lead him, without any dread of evil consequences; and with the sure conviction that natural science, when pursued with a right spirit, will foster the reasoning powers, and teach us knowledge fitted, at once, to impress the imagination, to bear on the business of life, and to give us exalted views of the universal presence and unceasing power of God.

---

[*] Speech of Dr. Chalmers at the Meeting of the British Association for the Advancement of Science. June, 1833.

The subjects discussed in this note are of great importance; and I am anxious to take away any wrong impressions which may have been produced by the writings of a false and unphilosophical school. In the furtherance of this object (though at the risk of being taxed with the fault of egotism and useless repetition) I will add one more passage, taken from an anniversary address to the Geological Society, especially as it appears in the pages of a periodical work not perhaps accessible to all the readers of this Discourse.

"There have issued from the English press, within a few years, such dreams of cosmogony as I believe find no parallel in the recent literature of continental Europe. It would be in vain to point out to such authors the nature of our data, or the method of our inductions; for they have a safer and a readier road to their own conclusions. It would be in vain to tell them that the records of mankind offer no single instance of any great physical truth anticipated by mere guesses and conjectures—that philosophical wisdom consists in comprehending the last generalizations derived from facts each of which is only known by experiment and observation; and in advancing, by such means, to those general laws by which all things are bound together. They seem not to know that inventive power in physics, unlike inventive power in works of art or of imagination, finds no employment in ideal creations, and only means the faculty by which the mind clearly apprehends the relations and analogies of things already known; and is thereby directed and urged on to the discovery of new facts, by the help of new comparisons—that the history of all ages (and I might add, the written law of our being, where it is declared that by the sweat of our brow shall we gather up our harvest,) has proved this way of slow and toilsome induction to be the only path which leads to physical truth.

"Laws for the government of intellectual beings, and laws by which material things are held together, have not one common element to connect them. And to seek for an exposition of the phenomena of the natural world among the records of the moral destinies of mankind, would be as unwise as to look for rules of moral government among the laws of chemical combination. From the unnatural union of things so utterly incongruous, there has from time to time sprung up in this country a deformed progeny of heretical and fantastical conclusions, by which sober philosophy has been put to open shame, and sometimes even the charities of life have been violated.

"No opinion can be heretical but that which is not true. Conflicting falsehoods we can comprehend; but truths can never war against each other. I affirm, therefore, that we have nothing to fear from the results of our inquiries, provided they be followed in the laborious but secure road of honest induction. In this way we may rest assured that we shall never arrive at conclusions opposed to any truth, either physical or moral, from whatsoever source that truth may be derived: nay rather (as in all truth there is a common essence), that new discoveries will ever lend support and illustration to things which are already known, by giving us a larger insight into the universal harmonies of nature*."

NOTE (D), p. 27. *Nebular Hypothesis.*

THE Nebular Hypothesis is well known; but it is so nearly connected with the discoveries of our own time, and with some of the speculations of this Discourse, that it requires a passing notice. It supposes our solar system to have arisen from the condensation of a *nebula*, or a great expanded mass of incandescent luminous vapour. There are, however, some preliminary questions, which must be answered before we can accept this hypothesis, and consider it either probable or true. Has it been drawn by fair induction from second causes? Is it based on any general truth of observation or experiment? Is it suggested to the mind by any prevailing analogy of the natural world? If not, we must banish it to those dark regions where idle dreams have been feigned to dwell:

Vestibulum ante ipsum primisque in faucibus Orci
* * * * *quam sedem Somnia vulgo*
Vana tenere ferunt, foliisque sub omnibus hærent.

While on this subject, the reader will, I trust, forgive me for endeavouring to adorn my pages with some words of oracular wisdom drawn from the great prophet of natural learning†. "God hath framed the mind of man as a mirror or glass, capable of the image of the universal world, and joyful to receive the impression thereof, as the eye joyeth to receive light; and not only delighted in beholding the variety of things, and vicissitude of times, but raised also to find out and discern the ordinances and decrees, which throughout all those changes are infallibly observed." * * * "If, then, such be the capacity and receipt of the mind of man, it is manifest that there is no danger at all in the proportion or quantity of knowledge, how large soever, lest it should make it swell, or out-compass itself: no, but it is merely the quality of knowledge, which, be it in quantity more or less, if it be taken without the true corrective thereof, hath in it some nature of venom or malignity, and some effects of that venom, which is ventosity and swelling." * * * "As for the censure of Solomon, *that there is no end of making books,* and *that much reading is a weariness of the flesh;* and that admonition of St. Paul, *that we be not seduced by vain philosophy;* let these places be rightly understood, and they do indeed excellently set forth the true bounds and limitations whereby human knowledge is confined and circumscribed; and yet without any such contraction or coarctation, but that it may comprehend all the universal nature of things."—We must not (Bacon tells us) "place our felicity on knowledge, as we forget our mortality;" and we must not "presume by the contemplation of nature to attain to the mysteries of God." * * * "If any man shall think, by view and inquiry into sensible and material things, to attain that light whereby he may reveal unto himself the nature and will of God, then indeed is he spoiled by vain philosophy: for the contemplation of God's creatures and works produceth, (having regard to the works and creatures, themselves) knowledge; but, having regard to God, no perfect knowledge, but wonder, which is broken knowledge." * * * "And hence it is true, that divers great learned men have been heretical, whilst they have sought to fly up to the secrets of the Deity by the waxen wings of the senses. As for the conceit that too much knowledge should incline a man to atheism, and that ignorance of second causes should make a more devout dependence upon God which is the first cause;—it is good to ask the question which Job asked of his friends: *Will you lie for God as one man will do for another to gratify him?* For certain it is that God worketh nothing in nature but by second causes; and if they would have it otherwise believed, it is mere imposture, as it were in favour towards God; and nothing else but to offer to the Author of truth the unclean sacrifice of a lie."

---

* Anniversary Address to the Geological Society, ANNALS OF PHILOSOPHY, *April* 1830.

† Bacon, *On the Advancement of Learning*, Book I.

These sentences are full of wisdom, and point out to us the true bounds and limitations of natural knowledge. We may expatiate freely and fearlessly among second causes, so far as we can comprehend them by sense and reason, and can draw conclusions from them by fair induction. In so doing we perform one of the purposes of our being. But if we take one step beyond these natural boundaries, we part with the implements of our strength, and at every turn of thought are led from the right way by "the seduction of a vain philosophy," and may go on building on nothing better than an empty dream. Should the Nebular Hypothesis be ever established on the firm ground of physical induction, we shall then gain from the contemplation of the heavens—what we have already drawn from a study of the earth—some knowledge of the second causes whereby the Maker of the universe has gradually fashioned the world of sense into its existing form. And should these contemplations give us some conception of physical changes brought about during countless ages before the first creation of man, and unrecorded in his traditions; what would be such changes, after all, but works of nature bounded both by time and space; and therefore as a speck in comparison of infinity; and all their long periods of elaboration but as a moment in comparison of eternity? They can, therefore, give us but a "broken knowledge." They may give us a conception of a great First Cause; but they can give us no conception of His essence—of His councils—of the movements of His will—of that which determined Him to show His sovereign power in works elaborated during periods defined by time and within bounds comprehended by sense—of what creation itself implies and in what it consists—of what was the first beginning of material things—of what is, or is not, a fitting exercise of His almighty power. Speculations on such points as these are unprofitable and irreverent, and belong to "the seductions of a vain philosophy, that seeks to fly up to the secrets of the Deity on the waxen wings of sense." We are invited to ascend the steps of the great temple of the God of nature, and we may be conducted within its courts; but we dare not draw aside the veil that hides the sanctuary, nor could the eye endure the brightness that is within it.

In the remotest regions of sidereal space are multitudes of *nebulæ*, or masses of cloudy light, of irregular but permanent forms. That such masses existed, had been long known to all who observed the heavens: for (not to mention the "milky-way," which is a vast expansion of nebulous light connected, perhaps, more immediately with our solar system,) several *nebulæ* are visible to the naked eye, and may more become revealed to the senses by the help of instruments of ordinary power. But Sir William Herschel, the greatest of all discoverers in the remote regions of the sky, by help of Reflectors, of his own invention and of enormous power, saw farther into the heavens than any observer had done before him, and thereby determined the figure, position, and other external conditions of a great multitude of *nebulæ*: and the younger Herschel, first repeating his father's observations and greatly adding to them, carried these Reflectors to the southern hemisphere, and, after several years of labour in this new field, has swept over the whole surface of the sky, and pierced all the remoter regions of sidereal space. Through the labours of these two illustrious astronomers we are now enabled to count these *nebulæ* by thousands.

While, seen through instruments of low power, all of them (as their name implies) look like masses of shining vapour: but when tested by the high power of the Herschelian Reflector, many of them are resolved into a multitude of luminous points, which have been well compared to "spangles of diamond-dust." Under such conditions a *nebula* loses all analogy to an elastic luminous vapour, and is but a great cluster of small stars at a vast but unknown distance from our system. Others, however, have resisted the severest test of the reflecting telescope, and not only seem to retain their nebulous condition, but present forms, apparently derived from a rotation about a fixed axis; and centers of bright illumination, that seem to indicate a condensation of nebulous matter round our own more fixed centers. Under this view, different *nebulæ* are seen in different stages of condensation: and though no changes have been traced in the forms of any one of them (and may not be traced for many ages to come), yet by bringing them all under a common law, and passing in imagination from one to another, we may, it has been concluded, trace the successive effects which, during by-gone ages, have been brought about through the gradual progress of condensation. Led by this assumed analogy, Sir William Herschel threw out his Nebular Hypothesis—that the whole solar system might once have been expanded through space as a great mass of elastic vapour; and assumed its present form by successive natural changes, like those inferred from the supposed condition of the nebulous masses in the remotest regions of the visible world.

Taking up this hypothesis, where it had been left by its author, La Place gave it a dynamical consistency by considerations which admit of an easy statement. If the matter of our system have been once expanded in the form of a spherical *nebula*, slowly revolving round a fixed axis, it might undergo a continual contraction of its mass by the radiation of heat into sidereal space. During the progress of such a change its velocity of rotation must continually increase; and we may suppose it, several times over, to have reached such a dynamical condition that the centrifugal force of its equatorial surface would exactly balance the whole attraction of the spherical mass within. After each such condition a nebulous ring might be thrown off by a further contraction of the whole central mass; and each nebulous ring would revolve, in obedience to Kepler's law, by a physical necessity implied in that very balance of forces by which the several rings were produced. Again, as this hypothesis involves no cause to produce any change in the first axis of rotation, each ring must revolve in the same direction and in the same plane. On this simple hypothesis the whole revolving *nebula* might pass into a system composed of a large central body surrounded by nebulous rings—all revolving in one direction, in one equatorial plane, and in periodic times corresponding to Kepler's law.

But the same cause which produced the contraction of the original mass must also produce a contraction of the nebulous rings. In this way each of them may be supposed to break up and roll into a spherical mass of more condensed nebulous matter. This change would, however, produce no dynamical force to disturb the original planes of movement; so that these secondary revolving *nebulæ* would continue to move in the common equatorial plane, and might finally pass into the condition of planetary bodies. But, before they reached this final state, these secondary *nebulæ* might pass through the critical conditions above indicated, and so might throw off a succession of rings; and these rings might in like manner undergo condensation, break up, and finally pass into the state of satellites; revolving, as before, in one direction and in a common equatorial plane. Thus, through progressive natural changes, we should end with a system having a central body surrounded by planets, and the planets, it might be, surrounded by satellites or rings—all obeying Kepler's law, and all revolving in one direction and in a common equatorial plane.

We may further remark, that however attenuated may have been the revolving nebulous mass, its parts may have possessed some tenacity which may have interfered with the mathematical consistency of the result. Again, as each ring was thrown off, the attraction of the central mass must have been, in a small degree, diminished. This of itself would produce a slight perturbation of the first nebular movements. Other irregularities would arise out of the deviations from a perfectly spherical form in the revolving bodies, and the mutual attractions of the rings must have produced mutual perturbations in their movements. But the limits of such perturbations can be defined by calculation, and could not throw the system into inextricable confusion.

The planes of planetery movement might therefore slightly deviate from the equatorial plane of the revolving *nebula*, out of which they had been formed; and the circular orbits would, by physical necessity, pass into elliptical orbits of small excentricity, in which the several bodies must continue to revolve in obedience to Kepler's law.

Thus we may suppose our system to have passed through all its transformations. The equator of the primæval *nebula* becomes the ecliptic plane of the system, with the sun in its center and the several planets and satellites revolving round the sun in the same direction, nearly in the same plane, in orbits that are nearly circular, and all moving in obedience to Kepler's law.

The oblate figure of the earth, its central heat, and the crystalline structure of the lower portions of its crust, seem to prove a former condition approaching that of igneous fusion. But we should far transgress the bounds of fair induction were we to affirm that the earth had been once in a nebulous condition; and still more, were we to assume that it had ever been in the condition of a nebulous ring, thrown off by a revolving mass of igneous vapour. I have just alluded (in this Discourse) to such an hypothesis; but only as a speculation, and nothing is built upon it. If, by strict dynamical reasoning upon the Nebular Hypothesis, we had reached consequences opposed to the phenomena of the solar system, we should have proved the hypothesis to be false. But because we can deduce a series of consequences from this hypothesis, which conform approximately to the phenomena of our system, we by no means prove it to be true. All we can dare to assert is, that the hypothesis lends itself readily to many phenomena of the solar system: but many an ingenious hypothesis, put forth with all the confidence of truth and long received with favour, has in the end proved worthless and untrue. We must ever bear in mind one of the three golden rules of Newton—"*Causas rerum naturalium non plures admitti deberi, quam quæ et veræ sint, et earum phænomenis explicandis sufficiant.*" The hypothesis we have been discussing rests only on an assumed analogy; and, should that fail, passes at once out of the rules of sound philosophy.

So far I have stated the reasonings which seem to give support to the Nebular Hypothesis. Let me now state some considerations that may be urged against it.

(1). It is not brought before us as a sure induction from fact or observation; but rather belongs to a class of speculations, which, whether true or false, go beyond our material knowledge. Men have ever been willing to desert the beaten track of natural science, and, instead of ascending step by step to the conception of laws by which separate phenomena are bound together, have dared to speculate about the beginning of things—to put themselves in the Creator's place, and to make a world after their own conceits. Such speculations have perhaps never done any good, and often do much mischief. Heat has a continual tendency to diffuse itself; yet the hypothesis commences by supposing its concentration in many large, but definite, portions of space. Whence came this concentration? It is not suggested by any conception we can form of heat, but seems rather in direct opposition to it. But, it may be said, the incandescent nebulæ have emanated from the fiat of Creative Will, and contained within themselves the germs which (when guided by the second causes ordained by God) produced in due time all the beauty and harmony of the natural universe. There may, perhaps, be no moral objection to such a view, provided it trench not on the phenomena of organic life; for it takes not from us our belief in Providence and final causes; and God, so far as our senses are concerned, appears only to work by second causes: but the whole speculation carries us out of the province of natural science, and is condemned by Bacon in some of the sentences quoted in the early part of this Note.

(2). The planets do not revolve in one plane. Can their different obliquities to the ecliptic plane be accounted for by the perturbations of the nebular rings? If not, we have a difficulty in the way of the hypothesis.

(3). The density of the planets does not conform to any law we might expect from the nebular hypothesis. This is an unexplained difficulty.

(4). The satellites of Uranus revolve not, like the other bodies, from west to east, but from east to west, and their orbits are inclined at great angles to the ecliptic plane. Here, then, we have a very great unexplained difficulty.

(5). Of all bodies in our system the comets are most nearly in a nebulous condition. They move in obedience to Kepler's law; but they cut through the ecliptic plane at various angles and in highly excentric orbits, which baffle all our conceptions of analogy with condensed rings thrown off by a revolving body.

(6). The formation of nebulous rings, on certain assumed conditions of condensation, has been explained by strict mechanical reasoning, and illustrated by direct experiment: but the formation of planetary nebulæ, by the breaking up of nebulous rings, has neither been explained by strict mechanical reasoning, nor illustrated by any direct experiment.

(7). Lastly, The original hypothesis of Sir W. Herschel has not been confirmed by the progress of discovery.

The apparently nebulous light of the "milky-way" is produced by confluent streams of light proceeding from innumerable telescopic stars. In like manner multitudes of smaller nebulæ have been resolved into luminous points.

They are only great clusters of stars at immeasurable distances from the eye. Hence arises a question suggested by Newton's second rule, "*Effectuum naturalium ejusdem generis eædem sunt causæ.*" May not all the apparent nebulæ be formed by the confluent light of stars? If many of them have been "resolved," might not all of them become "resolved," had we telescopes of sufficient power? Should astronomers be enabled to give a positive answer to this question, there will be an end of the Nebular Hypothesis; for it will have no analogy to rest upon: and, since the last edition of this Discourse was printed, the truth of such an answer has, to say the least of it, been made probable by the discoveries of Lord Rosse; who, by help of his gigantic Reflector, has succeeded in resolving into luminous points several of those remote masses of sidereal light, which had been appealed to as giving the surest evidence of a true nebulous condition.

However great the names connected with it, and however favourable its acceptance with the scientific world, the Nebular Hypothesis verges not, as has been asserted, "on the region of ascertained truth." It is at present nothing better than a splendid vision; and before it can be received as a physical reality, it must be supported by better evidence, and placed on a firmer foundation than that whereon it is at present made to rest.

NOTE (E), p. 31.

As I am anxious that this passage, and the one immediately following it on the same page, should not be misunderstood, I will endeavour, in the simplest words I can find, to explain my meaning.

The preceding Discourse offers to the reader no scheme of ideal perfection; but, on the contrary, gives a short comment on the physical, classical, and moral studies of our academic course; and against certain parts of them brings forward some grave objections. Any discussion on the evidence of our religion, on its doctrines, its hopes, or the course of life pointed out by it, was beyond the direct purpose of my argument: and in an address to a Christian assembly, I had a right (as has been stated in the concluding words of this Discourse) to assume the truth of all the great fundamental doctrines of our religion, while discussing other truths of a different kind, and resting on a different foundation.

In an early part of the preceding pages (p. 14...p. 31) I have endeavoured, from the light of nature, to establish the following conclusions:—

(1). The being, power, and wisdom of God, as shown in the whole fabric of the material world; all the parts of which are bound together by material laws ending in harmony and order.

(2). A confirmation of this conclusion, drawn from the skill and prescience shown in the whole framework of animated nature.

(3). A further confirmation, drawn from the adaptation of all parts of nature, whether animate or inanimate, to one another. No parts are independent. Each part is governed by its own peculiar laws; yet subordinate to higher laws, by which the several parts are kept together under one common plan and purpose.

(4.) The proof of a continued providential government, derived from the creative introduction, during many successive periods of time, of new organic structures adapted to new physical conditions of the earth.

(5). The probability of a future state of being, grounded on analogy. The organs of every animal are knit together with consummate skill; and wisely adapted to all external nature, for the use and support of the beings endowed with them. In man, moral powers and capacities are superadded to his animal organs. He not only forms a conception of the future, but he has a "longing after immortality." To believe that such capacities and appetencies were given for no purpose—were to have no fruition in futurity—would be against all analogy, and imply a phenomenon that jarred with the universal harmony of nature. On grounds such as these many heathens "have built their hopes of continued being and future glory."

Again, in a following part of the Discourse (p. 44), I have stated it as a fact, drawn from our knowledge of all past history, that under no form of government can man be maintained in personal happiness or social dignity, without the sanction of religion. This assertion is not new: were it so, it would contradict itself. It has been emphatically urged by some of the old heathen historians; and we may assuredly conclude, as a fair induction of reason grounded on analogy, that the religious nature, implied in the very existence of this historical fact, was given to man for the purpose of directing him in the way of truth, and guiding his soul towards the highest objects of his creation.

While on this question, I may allude to a conversation I once held with the illustrious philosopher La Place. It was in his sick-chamber, which, I believe, he never left; and not many days before his death. Among other subjects, he inquired into the nature of our endowments, and our course of academic study; which I explained to him at some length. He then dwelt earnestly on the religious character of our endowments, and added (as nearly as I can translate his words), "I think this right; and on this point I should deprecate any great organic changes in your system; for I have lived long enough to know, what I did not at one time believe, that no society can be upheld in happiness and honour without the sentiments of religion." The dying philosopher may, while using these words, have had nothing in his mind beyond the principles of worldly wisdom, and the bearing of religious sentiments on the order and well-being of the state. On this point I venture not to inquire. But the words record a great practical truth; and, having fallen so impressively from his lips, are surely worth recording.

I believe that all the preceding conclusions of this Note are incontestably true—based, as they are, both on reason and experience; and if they be true, they must be of deep importance. On this subject I may refer the reader to the early parts of the two following Notes (F) and (G), and need not repeat what is, perhaps, there stated with sufficient fulness.

On the other hand, every Christian must allow that the light of natural religion is too dim to guide a man securely along the thorny path of life, and offers him sanctions much too feeble to hold him upright in the time of temptation. Again, in old age, and in the approaching hour of death, what secure comfort is left to the heathen? All the faculties which have ministered to his strength are on the point of dissolution. He knows that in many things he has offended against his Maker. The world he is about to leave has many penal dispensations. How knows he when those penal dispensations are to end? Supposing him to believe in a future state, what security has he for his own condition in futurity? Doubt and perplexity are on every side of him. He may have learnt to smother the feelings of his nature in a stoical indifference; or he may, under the very best view we take of his condition, comfort himself with some feeble hopes, and apply to himself some words like those of Tacitus—"*Si quis piorum manibus locus; si, ut sapientibus placet, non cum corpore extinguuntur magnæ animæ; placidè quiescam.*" But how cold and cheerless are words like these when confronted with the declarations of an inspired Apostle!—"*To me to live is Christ, and to die is gain...I am now ready to be offered, and the time of my departure is at hand. I have fought a good fight, I have finished my course, I have kept the faith: henceforth there is laid up for me a crown of righteousness, which the*

Lord, the righteous judge, shall give me at that day; and not to me only, but unto all them also that love his appearing." A firm believer in revealed religion has both support in life and comfort in death. The evidence of his religion is full and clear, and is addressed both to his heart and understanding. His hopes of a future state are sure and certain; the grounds of his acceptance before God are plainly set before him; his rule of life is simple; and, if he be a faithful follower of his Master, he has a power of obedience which comes from above, and will not fail him. It is true that some of the mysterious doctrines of his religion are so far above reason, that no man by the natural powers of his understanding could have ever risen to any conception of them; yet they end not in mystical abstractions; but, when rightly understood and heartily accepted, they have a direct bearing on the daily business of life: and though above natural reason, they are not contrary to reason; but have been proved by many pious Christian writers (especially Bishop Butler) to come within the analogy of God's dealing with his creatures in the government of the natural world.

What mercies God may have in store for a heathen who has done his best with the feeble light that has been given him, is a very vain and unprofitable inquiry. But we do know, from the solemn denunciations of God's word, that to turn away from the light of the revealed word, when that light has been plainly set before us, is deadly sin. While this light is offered to us, to turn away from it, and to seek any other light as our guide towards the throne of mercy, would be madness and folly, like that of an arctic savage who should remain in his hut of snow by the side of his dismal winter-lamp, after the sun of a new summer had again visited his frozen country. All the preceding conclusions of this note appear, in one form or other, in the early editions of this Discourse, and are repeated here that I may the more directly meet some objections which have been urged against them. To prevent mistake I will endeavour to state these objections in the words of their author; and I will begin with his attacks on the moral portions of the Discourse*.

"You, Sir, make creation religion and moral religion to lead to the everlasting enjoyment of God, independently of all revelation; and that, too, while your principle-poisoned youth, and followers, are enveloped in the anti-revelation delusion of your Geological speculations." (p. 123)

"Here, Sir, you lead all your instructed youth to build their hope of the everlasting enjoyment of the God of nature, and of eternal glory, upon the volition of their intellectual powers, acting on the works of nature, without the Word of God. And not only so, but, with an unparalleled presumption, you as it were challenge the eternal God to deceive any mortal that lives and dies in such a religion! And these your doctrines, and your unheard-of challenge of the Almighty, are precisely the same in your anti-scriptural and anti-christian presumptuous moral code; and you fearfully aver that man can attain to the eternal enjoyment of God and of glory equally by the one as by the other." (p. 125.)

"And this was the destructive philosophizing delusion, under the prostrating enchantment of which the Rev. Adam Sedgwick was carried through the preaching of that enormous Christian and ministerial anomaly—a geologizing and moralizing sermon, in the public academic worship of God, which openly professed to treat of questions that had nothing to do with divine revelation, or divine revelation with them!—but which at the same time maintained, that the discussion of these questions laid down sure roads to everlasting glory: and that no one who aspired to that eternal glory by walking in them, should either be deceived or rejected of God." (p. 130.)

---

* The work to which I refer is entitled, *Popular Geology subversive of Divine Revelation*. (London, Hatchard and Son, 1834.) In itself it deserves perhaps no reply; but I notice the objections in this edition of my Discourse, as some of them have been repeated by other writers, and in a form which requires a respectful consideration.

"While science envelopes him in her enchanting robe, and the hands of a kindred age's applause lend their aid to hold it on, none but God himself, by an intervention of sovereign mercy can prevent such a one from drifting down the tide of philosophic fame to everlasting perdition: as the same eternal wisdom saith, *The prosperity of fools shall destroy them;* and, *The lips of a fool shall swallow up himself.*" (p. 136.)

Do I then plead guilty to such a list of formidable charges? Not to so much as one iota of them. They are nothing better than the dreams of a disordered imagination: and were they true, their impression would be far deeper had they been conveyed in less turgid language. All reasoning must lead us into inextricable confusion if we keep not separate the different provinces of human knowledge; and while we vainly blend together truths human and divine—neither discriminating the foundations on which they rest, nor the evidences on which they are built up—we must end, to use the words of Bacon, in an heretical religion, and a fantastical philosophy. But we may compare together the streams of knowledge, though springing from different fountains; and we can sometimes show that in their course they become blended together at some common point: and hence we may conclude, as all truth centers in the ordinance of God's will, that the different kinds of truth must harmonize and lend support to one another. It is, therefore, a delightful intellectual task (and I might add a wholesome moral task) to trace the analogies of our Maker's dealings with us in the natural and spiritual world.

While Bishop Butler was employed, during years of patient thought, in tracing the analogies of natural and revealed religion, was he thereby endeavouring to set up natural religion in the place of revealed? His thought and purpose were far different. He was destroying the strongholds of deism—giving a wholesome food to the intellect of man—taking a film from the eyes of the sceptic—and using such powers as God had given him in bringing back to the light of revealed truth many who were wandering amidst doubt and darkness.

I can pursue this subject no farther. A flat denial is the best answer to give to the inflated charges above quoted; and I again affirm that I have not, in thought or word, set up natural in the place of revealed religion, or dared to affirm "that we can attain the eternal enjoyment of God and glory equally by the one as by the other." The imputation has no foundation whereon to stand, and the vituperative comment of its author must fall along with it.

Strong objections have been urged, from more than one quarter, against the following passages of the Discourse:—"The rejection of the moral sense on religious grounds is one of the errors of fanaticism.—Amidst all the ruin that is within us there are still the elements of what is good," &c. &c. (*supra*, p. 58.)—"Some men have rejected natural religion through mere fanaticism. They believe our corruption to be so entire that they deny to the natural man all perception of the beauty of moral truth—all knowledge of God—and almost shut out from him the faculty of reason." (*infra*, p. 158.)—"High principle directs and controls the capacities and affections of our moral nature, but compels us not to root them out." (*infra*, p. 169.)

Let me endeavour, so far as I am able within the narrow limits of this note, to explain my words, which have been misunderstood and strangely tortured from their meaning. The following are among the great fundamental doctrines of our religion.—That "man is very far gone from original righteousness, and is of his own nature inclined to evil"—that our Maker is pure and holy, and requires from us nothing less than perfect obedience—perfect both in will and deed.—That every son of man is, therefore, guilty before

God, and under sentence of condemnation.—That a remedy has been provided for us in the person of Jesus Christ; who not only showed in himself an example of perfect purity and holiness, but opened for us a way to future happiness, by the voluntary sacrifice of himself—thereby satisfying the severe attribute of God's justice, and blotting out the written sentence of our condemnation.—That a faithful acceptance of this doctrine is the principle and foundation of our forgiveness, and by inherent moral necessity fills the heart with thankfulness and love.—That a full perception of these doctrines is not enough.—That after we are forgiven and restored to our Maker's favour, infirmity and corruption still clings to us.—That we require, after admission to the covenant of mercy, through our whole lives continual support and renovation,—to be maintained only by communion with God and the sustaining grace of his Holy Spirit.—That in this way God may dwell in our hearts as our Maker, our Redeemer, and our Sanctifier.—That from first to last this scheme of salvation is the free gift of God; not purchased by our own works, or claimed by us on any score of self-sustained inherent personal merit of our own.—The proper effects of these great doctrines, when faithfully received in the heart, are an enlarged charity—a purity of life grounded on the highest sanctions—and a ready acknowledgement of the goodness and providence of God in all his dealings with us.—The film which dims our vision falls away—the passions which desolate the world become obedient to law and order—we see in everything around us the power and benevolence of our Maker—all the higher faculties, moral and intellectual, receive their noblest exaltation; and now at length subservient to the true purposes of our being, become "a rich storehouse for the glory of the Creator and the relief of man's estate."

Whatever view we take of the inborn faculties of man—whether we regard them as physical, social, moral, intellectual, or religious—we see enough to make us comprehend, at least in part, the great purposes for which they were first given, and the dreadful evils to which they are turned by the depravity of the human will. But this perversion of the original powers which we derive from our Maker's hand, is no proof that every germ of them has been utterly rooted out. Under the government of a renovated will the same powers may be brought again into subordination, and made to fulfil the original purpose of their being. While we confine our thoughts to the combined physical powers of man we can as easily conceive they should last for ever, as that they should last only a hundred years: but we know, as a matter of fact, that after a few years, under whatever guidance they may be held, and by whatever care maintained, they sink into decay and end in death. So also we know that the moral and intellectual powers—all that belong to the inner man—if left to themselves must end in decay and spiritual death. Meanwhile, however, our moral and intellectual powers are not utterly extinguished: they are present with us from first to last, though dimmed, obscured, and perhaps unheeded; and at every step of our lives we are responsible both for the use and the abuse of them.

On the mere *physical powers* of the animal frame I need not dwell; for they manifestly exist, whether they be instruments of good or evil.—The *social affections* exist in all men, although most noble when under the guidance of high principle. They are good in themselves; though, like everything else in human nature, they may become perverted to evil. Not to lose ourselves among the complicated relations of social life, let us confine our view to the example of maternal love. This natural affection is as plainly seen in the untaught wife of a savage as in a christian matron. That the *moral faculties* are not utterly blotted out from the mind of man is proved by the language of every civilized nation, heathen as well as christian. What are the terrible sanctions of all penal law, but a natural struggle, in one form or other, of moral principle against base passion? That the *intellectual powers*, employed in the discovery of abstract truth, are independent of religious faith, is most certain. Yet are they good in themselves; and when kept in their proper place, minister at once to the good of man and the glory of God. Lastly, there is a *religious capacity* in man, and a *religion of nature.*

For *the invisible things of God from the creation of the world are clearly seen, being understood by the things that are made, even his eternal power and Godhead: so that the heathen nations are without excuse; because when they knew God, they glorified him not as God, neither were thankful.* It was not, then, so much a dimness in the light of nature or a defect in the understanding, as a disorder in the heart and affections, which led men into the fantastical rites of idolatrous worship—often ending in impurity and blood. But even among such diseased and convulsive struggles toward the worship of God—impure, cruel, and unhallowed as they are—we can discern the proofs of an inherent religious nature which cannot be rooted out, however much it may be defiled or misdirected.

Can we then affirm that the ruin of the natural man is so complete that there remains not within him one element of good—that he is one mass of corruption—that he is born without kindly affections or moral capacity—that he has from nature no conception of a Godhead? Unquestionably not. This is not the nature of man. Were such his condition, he could not even form the conception of any moral law to which he was bound to give obedience; and being without law, he would, in the language of the Bible, be without transgression.

In the language of our Church "man is very far gone from original righteousness, and is of his own nature inclined to evil."—Again, she tells us, "We have no power to do good works pleasing and acceptable to God, without the grace of God by Christ preventing us, that we may have a good will, and working with us when we have that good will."—These two propositions are drawn from the Word of God. The first contains a doctrine of the Bible and a fact of universal experience—the second tells us that through all the duties of a religious life, from its beginning to its end, we can only be upheld by a steady communion with our Maker. There is not, I believe, one sentence in the preceding Discourse that is in conflict with either of these propositions.

While we speak of fallen man we may figure to ourselves a being prostrate on the ground, entangled in the mire, and incapable of onward movement. But he is lifted up by a power superior to his own—a new spirit is breathed into him—new strength is given him—and a staff is placed in his hand whereon he may lean securely and go on his way rejoicing. The office of spiritual religion is not to destroy the faculties of the mind and body, but to renovate them and restore them to their proper use, as obedient instruments in their Maker's service. Without religious government they are the slaves of passion and the implements of mischief; under it they are the willing instruments of good.

The views against which I have been contending are fanatical, mischievous, and untrue; and they naturally end in uncharitable judgments, in sour ascetical religion, or in some form of monastic superstition. But while combating one class of errors, let no one accuse me, without proof, of falling into another. I set not up natural religion in the place of revealed: I am no advocate of modern "Rationalism:" nor have I once asserted (as I have been made to do by a pretended, but false quotation from this Discourse) that man, as a religious being, can be converted from evil to good by the mere natural power of persuasion acting on the moral elements within his bosom, and without spiritual help.

Objections have been taken to the language of a previous note (Note C), and it has been described as too bitter to bring conviction with it, or serve a good purpose. If in a single sentence I have offended against Christian charity, I am sorry for it; but it is now too late to change the language of this note. It describes the inveterate follies of a class of men, and was written without ill will to any one of them; and the words I have used do no more than express my meaning. Perhaps my best justification will be found in the following passages, taken from the work I have already quoted in the present note. They were written, in reply to the first edition of this Discourse, by a Clergyman and a member of the University of Cambridge; and they show (it may be in a grotesque and somewhat exaggerated form) the sentiments and comments of the class to which I have just alluded.

"Every common-sense being knows, and every honest Geologist must confess, that, to find the date of any one deposit in the earth's bowels, is beyond the limits of mortal ability, and defies that of the Geologian himself. God has given these deposits a date, and no mortal can give them any other."

"What is the sum and substance of all pre-creation Geology? What is the true amount both of its basis and its superstructure? We sacredly defy all the Geologians upon earth to prove it to be more than *bare hypothetical supposition*—or, to use the words of the academic Geological standard, 'mere (philosophically) *expanded nebulosity.*' And yet this is the *exactness of truth* which infidelity now hails, and sets up as proving the *eternal Word of God to be untrue!*"

"The speculative Geologist who gathers up phenomena left by the revealed creation and the flood, and out of these vamps up a baseless fabric of human imagination . . . . is but the deluded vassal of the enemy of God and man in his day and generation, and stands a monument of pity and of folly before the eyes of the most unlettered *child of everlasting Wisdom!*"

"No specific science which the researches of the children of Ham have bequeathed to the world, is either so baseless in itself, so hostile against God, or so destroying to the souls of men, as the this-day's visionary fabric of the revelation-instructed Geologian!"

Has this rash author studied the physical records of Creation, or examined so much as one single fact on which the inductions of Geology are founded? He has done no such thing. He knows not one element either of the language or reasoning of the science. But he has a shorter way to knowledge. In his comment on the opening passages of the Bible (about which, in all ages of the Church, wise and honest writers have expressed doubt and difficulty,) he tells us he "has found the brightness of revealed veracity concerning the Creation open itself upon him with more and môre self-evident demonstration," and discovered "the baseless foundations upon which all the nebulous superstructure of the admired *new science* has been built." With all the confidence of a critic, strong in his own infallibility, he tells us that he has "insubvertibly established, from the lips of eternal veracity, that neither the earth, nor the materials of which it was formed, nor any creature that is found therein, had existence before the first (Mosaic) day of Creation."—"*That truth* he has undeniably and everlastingly established, insubvertible and immovable by mortal ability!"

Words like these would better become one sitting on the throne of the Vatican, and invested with the triple crown.

Extremes will sometimes meet—ignorance and confidence will sometimes go hand in hand. This rash author (only deserving notice as the representative of a class) has dared to bring revealed and natural truth into unseemly collision. Were Geology nothing better than an airy fabric of hypotheses, this might, perhaps, be done without moral mischief. But Geology is a firm fabric, and is built on a secure foundation. Its leading truths are based on nothing less than a physical demonstration: and no natural truths within the range of human knowledge are more certain than those of Geology. No moral evidence, no matter from what source that evidence may come, can ever shake them. If they be not true, then is there no such thing as natural truth to be apprehended by the mind of man, and spite of himself he must sink into hopeless scepticism. But we have no fear of any such dismal end of human knowledge. The utmost evil (if indeed it be an evil) that can arise from the collision of the records of physical and religious truth, will be a slight change in our first literal interpretation of one or two obscure passages, which have no immediate bearing on a single doctrine of Christianity, and are neither concerned with our conduct in life, nor our hopes of a state of future being.

Meanwhile there are (in this pretended and unnatural collision) evils of another kind, which every good man will do his best to shun. Fanaticism and intolerance ever go hand in hand. One who presumes on his own infallibility, who thinks himself strong in his one-sided knowledge, and who rushes to conclusions without troubling himself with the grounds of them, must not be expected to show forbearance or charity towards those who remain one step behind him. In illustration of this point, I will give two more extracts from this rash and intolerant author. On his own literal explanation of the opening verses of the Mosaic records, he tells us that they are "simple, plain, divinely majestic, and self-explanatory." "And yet (he adds) it is in this fair, pure, luminous, holy field of everlasting truth, that the impious progeny of infidelity has ever delighted to deposit their accursed spawn! It is beneath this self-evident surface of heavenly Verity that infernal policy has ever exulted in sinking its hell-deep pitfalls of satanic interrogation!" . . . . . . "Abhorrent mortal impiety has ever reasoned and interrogated thus—*Well! but if this world only began at the first day of Creation, where was God, and what was he doing, all the eternity before?*" But what is the answer to this most profane and idle question? The author gives it in the form of a quotation, which he tells us is bold, true, and comprehensive—"*God was decreeing from everlasting a hell for all infidel enquirers.*" I accuse not this author of dishonesty or bad intention: fanaticism may however sometimes be the more mischievous because it is honest. Language such as I have quoted might have better suited the mouth of a Dominican monk of the fifteenth century; but during no period can it do good service to the cause of truth.

What has been above stated is, I hope, enough to vindicate some portions of the Discourse which had been exposed to unfavourable comment, and at the same time to justify the severe language of a previous Note [Note (C), p. 104—118]. To make some amends to the reader for having placed before him so many unpleasant passages, I will end with a well-known, but noble, quotation from the works of Bacon, as it comes home to the meaning of this long note:—

"It is an assured truth, and a conclusion of experience, that a little or superficial knowledge of philosophy may incline the mind of man to Atheism, but a farther proceeding therein doth bring the mind back again to religion: for in the entrance of philosophy, when the second causes, which are next unto the senses, do offer themselves to the mind of man, if it dwell and stay there, it may induce some oblivion of the highest cause; but when a man passeth on farther, and seeth the dependence of causes, and the works of Providence; then, according to the allegory of the poets, he will easily believe that the highest link of Nature's chain must needs be tied to the foot of Jupiter's chair. To conclude therefore, let no man, upon a weak conceit of sobriety,

or an ill-disposed moderation, think o that a
man can search too far, or be too well book
of God's word, or in the book of God's wo or
philosophy; but rather let men endeavour an e
gress or proficience in both; only let men beware th
apply both to charity, and not to swelling; to use, and n
to ostentation; and again, that they do not unwisely
mingle or confound these learnings together."

NOTE (F), p. 32.

IT has been sometimes objected to natural religion that it misleads men by a dim and deceitful light, on matters clearly put before them in the word of God. The objection is sound, so far as it applies to those who set up natural, in the place of revealed truth: but it is invalid in any other sense, as it strikes at the root of all knowledge that is not religious. If the conclusions of natural religion be true, then must they well deserve our study; and they are of no small moral worth, provided they be kept in their proper place, and in subordination to truths of a higher kind. Were all men honest believers in the word of God, then could the inductions of natural religion add nothing to the strength of their convictions of his being and providence. But to doubting minds, entangled in the mazes of a false philosophy, or lost perhaps in sense, and unused to any severe exercise of thought, the ready inductions of natural religion may bring convictions of the greatest moral worth—at moments, too, when proofs of a different kind would be denied all access to the understanding. Moreover, the habit of contemplating God through the wonders of the created world, and its adaptation to the wants of man, is not only compatible with firm religious belief, but with the highest devotional feeling; as is proved by passages, almost without number, in the sacred poetry of the Bible.

The chief ground, however, for urging the habitual study of natural religion upon those to whom the preceding Discourse is addressed, is the belief that it is a wholesome exercise for the understanding. In rising, step by step, to an apprehension of the great laws of the material world, it is surely well for us to have ever present to our thoughts the conviction that these laws are but a manifestation of the will of a preordaining mind; and in noting the countless relations of material things around us, and their fitness for each other, we surely ought not to shut our eyes to the ever-living proofs of wisdom and creative power. The study of the kingdoms of nature, conducted in such a spirit, not only strengthens and elevates the natural powers of man, but tends, I believe, to produce a cheerful sobriety of thought most favourable to the reception of sound religious impressions. Such appears to have been the temper of Paley, especially during the latter years of his life: and, in mentioning his name, I cannot but urge on all those who are commencing their academic course, the habitual study of his delightful work on Natural Theology. It is hardly possible to read this book without catching part of the Author's spirit; and if this spirit be gained, we shall then find the material world with a new life breathed into it, and speaking a language which, to those uninstructed in its meaning, may fall upon the ear without suggesting a single appropriate train of thought.

Since the preceding Discourse was delivered, some very important and elaborate treatises have appeared (and others are in progress), enforcing different parts of the great argument to be drawn from final causes. It is, I think, impossible, that any one of them, or all of them together, should supersede the work of Paley. They may expand and enforce his argument by new and pregnant illustrations; and they may supply some deficiencies in his work, especially in the part that treats of the adaptation of the mechanical laws of the universe to each other, and to the wants of man.

With one part of the mechanical argument he has indeed attempted to grapple; but not, I think, with the same power he has put forth in the other portions of his volume.

To comment on the treatises just alluded to would be quite out of place in a note like this: but I may be allowed to rejoice, in common with many other Members of the University, at the appearance of a work (referred to in a former note, p. 101) which, combining a philosophic view of the highest generalizations of exact science with an original and well-sustained argument drawn from the universal proofs of wisdom and design, falls in admirably with the course of reading of our best class of students. It is assuredly not too much to say, that this author has well earned the honour of filling up a chasm in the moral literature of his country.

Paley has stated with his usual clearness and skill the importance of comparative anatomy to the doctrine of final causes[*]. The philosophic anatomist tells us that the organs of each animal may be described as parts of a machine well fitted together, and exactly suited to the functions they have to perform. He reasons from the function to the organ, or from the organ to the function, with perfect confidence; and in cases too where the living type has been never seen. This adaptation may now be called a law of organic structure; and it has been proved only by patient observation, like every other inductive physical truth. When once established it becomes the animating principle of every department of natural history: both helping us in the arrangement of known objects, and in the interpretation of new phenomena. To form an adequate notion of the importance of this law, we have only to bear in mind how it enabled Cuvier to reassemble the scattered organs of many beings of a former world—to determine their place in the scale of animated nature—and to reason on their functions with as much clearness as if they were themselves still living before him.

---

[*] *Natural Theology*, Chap. XII.

In passing from one order of beings to another as they stand arranged in a museum of comparative anatomy, we see a continued repetition of the same organs, yet in each successive instance we find them changed in a greater or less degree in their proportions and manner of adjustment. This most striking fact bears directly on the argument for design. "Whenever we find a general plan pursued, yet with such variations in it as are, in each case, required by the particular exigency of the subject to which it is applied, we possess, in such a plan and such adaptation, the strongest evidence that can be afforded of intelligence and design; an evidence which the most completely excludes every other hypothesis." This view of the argument admits of endless illustrations. To each man those instances are the best that spontaneously offer themselves to his mind. The real difficulty is to teach men first to enter on such trains of thought, and to shake off that torpor in which their senses seem often to be steeped. Paley's instances are well put, and full of meaning: I will endeavour to add one or two familiar examples to them, though at the risk of extending this note to an unreasonable length.

Of all the solid parts of the animal frame, the most obviously mechanical are the jaws and teeth; we know, in each instance, the office they have to perform, and we know that they perform it well. Let us then examine, in a museum of comparative anatomy, the jaws of some one order of animals—for example, the carnivorous. In each instance we find cutting teeth in front, sharp fangs on the sides, and molar teeth in the back part of the jaws. The molar teeth rise into sharp lance-shaped points of hard enamel, and overlap each other in the upper and lower jaw, like the edges of a pair of shears. We see at once an apparatus will fitted for tearing and for clipping flesh, and, in some cases, fitted also for cracking bones; but not at all suited for grinding the seeds or stalks of vegetables. Let us then observe the manner in which the jaws are fitted to one another. At each end of the lower jaw rises a well-defined transverse process, working in a corresponding depression of the skull; in short, the jaws work together by a firm hinge, allowing them to open and shut like a pair of shears, but admitting of no grinding motion. That such an articulation is important for the carnivorous animal no one can doubt, who has observed how ill a pair of scissors perform their office with a loose hinge. Thus we see, from one end to the other, an implement well suited for its work, and all its parts in good adjustment. But all these nice adjustments would be lost, were there not levers attached to the jaw, and muscles to work the levers—were not each part of the animal frame adapted to all the other parts—and were not the instincts and appetites of the animal such as are fitted to give to this framework its appropriate movement.

Let us then turn to another order of animals of strongly contrasted habits—for example, the ruminating. We find the lower jaw armed with incisor teeth, working against a hard callous pad, placed upon the upper. This prevents the animal from inflicting a severe bite, but enables it readily to crop grass and to tear off the stalks of vegetables. The sharp fangs are wanting; but, were this the place for the observation, we might shew how it is protected from the fiercer beasts by the instinct of fear combined with acute senses and great fleetness—by gregarious habits—and by formidable weapons of defence placed on its brow, and given, be it observed, to none of the carnivorous tribes. Its flat-topped molar teeth are not formed for cutting, but for grinding; and its jaws are loosely fitted together, so as to allow of a grinding movement. With a change of form in one part, is a change of adjustment in another, and the parts continue to work well together. Had the articulalation of the carnivorous jaw remained unchanged, the herbivorous tooth could not have performed its office. But we have not yet done with the adjustments. In the ruminating animal, enamel covers not the top of the tooth, as in the carnivorous; but the hardest portion of each tooth is arranged in deep vertical layers, alternating with bony matter; and this arrangement, in all states of the tooth, secures a rough grinding surface. These layers are arranged in irregular curves running lengthwise in the jaw, and their convex and concave portions are so delicately opposed in the upper and lower jaw, as to produce, during a lateral movement (like that of a cow chewing the cud), the greatest possible quantity of friction. Again, we might go on to shew the adaptation of the muscles of the head to the apparatus here described; and, beginning with the jaw, we might go through the whole animal frame, and prove that all the parts were skilfully contrived and fitted together so as to minister to the wants of the beings they belong to.

Let us next see what is the structure of the jaw in animals of some different and intermediate order. Perhaps the best for our selection are the *rodentia*, or gnawers. Like the ruminating animals, they are without fangs; but they have long sharp cutting teeth, meeting together like a pair of pincers That these implements are useful to the creatures possessing them, no one can doubt. It is by their help that the beaver saws down a tree for his water-dam, that the rat gnaws his way through a board, and that the squirrel drills a hole through the shell of a nut, and extracts the kernel. Most of the animals of this order are herbivorous, and therefore grind their food with flat-topped molar teeth. But how is this duty to be performed, as the front teeth lock together in such a way as to make a transverse grinding movement almost impossible? It is provided for by a new adjustment. A process of the lower jaw works in a depression of the skull, as in the carnivorous order. The articulation admits however of more play, and its direction, instead of being transvere, is lengthwise, and thus allows the lower jaw to rub, like a carpenter's plane, backwards and forwards upon the upper. Every one must have been struck with this movement who has seen a rabbit eating the leaf of a cabbage. The work of nature would still be left incomplete, were there not also a corresponding adjustment in the structure of each tooth. We find then, on inspection, that the hardest portions of the molar teeth are arranged in vertical layers (as in the *ruminantia*), and that they form a good grinding surface; but the direction of the layers is now transverse to the jaw. This is what it ought to be, in order that the teeth may work to the best advantage. The hard layers are transverse to the teeth, for the same reason that the iron of a carpenter's plane is transverse to the direction in which the workman uses it. But this is not the only new adjustment in the teeth of these animals. The incisors being implements of perpetual use, are renewed by perpetual growth; there is a special provision for their support in a bent socket, and being enamelled only in front they are always kept sharp. By the very act of gnawing, the hinder part of the incisor wears away quicker than the fore part, and in that way always preserves a sharp inclined edge like that of an adze or chisel—the very form that is wanted by the animal. It is not enough to say that all these adjustments are complete: what would be their value, were not the muscular frame also fitted to them, and the animal powers such as to call them into action?

These instances are among the most obvious and well-known, in comparative anatomy, and have been quoted on that very account. The same kind of reasoning might be applied to the organs of all animated beings; and there is literally no end to the examples of mechanical adjustment. Considered in this way, they put the proofs of contrivance and design in the clearest point of view, and give the argument a unity and connexion it cannot have by the mere consideration of detached instances.

Once for all, and by way of recapitulation, we see the proofs of wisdom and design in the structure of every being endowed with life. The argument is cumulative; each instance being perfect in its kind. We see the proofs of wisdom still more clearly when we review the classes and orders of animated nature; for we find the God of nature working upon a plan, and adapting the same organs to different ends, by a series of delicate mechanical adjustments. Our argument gains strength as we ascend to a consideration of the mechanical laws impressed on matter: for law implies a lawgiver, and without that notion the word law is without meaning. Still more strengthened is our argument as we learn to comprehend the exquisite adaptation of these laws to the organs and functions of all living beings. We see, then, through all nature, animate and inanimate, but one unbroken impress of wisdom and power: and the conclusion at which man thus arrives, elevates his intellectual condition, and falls in with the appetencies of his moral nature. Surely then we may conclude with Paley, that the world around us proceeds from design and intelligence—"intelligence properly and strictly so called, including under that name foresight, consideration and reference to utility."..."After all the schemes of a reluctant philosophy, the necessary resort is to a Deity. The marks of *design* are too strong to be gotten over—design must have a designer—that designer must have been a person—that person is God*."

NOTE (G), p. 41.

IN confirmation of what is stated in page 41, I may refer the reader to Xenophon's *Memorabilia*, Book I. chap. iv.

* Paley's *Nat. Theol.*, end of Chap. xxiii.

The following dialogue shews Socrates' strong and graphic manner of putting the argument from final causes. It is carried on in his own method of piling question upon question, and immediately follows a sentence in which Aristodemus had expressed some doubt whether animals were made by chance or design :—

Τῶν δὲ ἀτεκμάρτως ἐχόντων ὅτου ἕνεκά ἐστι, καὶ τῶν φανερῶς ἐπ᾽ ὠφελείᾳ ὄντων, πότερα τύχης καὶ πότερα γνώμης ἔργα κρίνεις;—Πρέπει μὲν τὰ ἐπ᾽ ὠφελείᾳ γενόμενα γνώμης ἔργα εἶναι.—Οὐκοῦν δοκεῖ σοι ὁ ἐξ ἀρχῆς ποιῶν ἀνθρώπους ἐπ᾽ ὠφελείᾳ προςθεῖναι αὐτοῖς, δι᾽ ὧν αἰσθάνονται, ἕκαστα, ὀφθαλμοὺς μὲν, ὥςθ᾽ ὁρᾷν τὰ ὁρατὰ, ὦτα δὲ, ὥςτ᾽ ἀκούειν τὰ ἀκουστά; ὀσμῶν γε μὴν, εἰ μὴ ῥῖνες προςετέθησαν, τί ἂν ἡμῖν ὄφελος ἦν; τίς δ᾽ ἂν αἴσθησις ἦν γλυκέων καὶ δριμέων καὶ πάντων τῶν διὰ στόματος ἡδέων, εἰ μὴ γλῶττα τούτων γνώμων ἐνειργάσθη; Πρὸς δὲ τούτοις, οὐ δοκεῖ σοι καὶ τόδε προνοίας ἔργῳ ἐοικέναι, τὸ, ἐπεὶ ἀσθενὴς μέν ἐστιν ἡ ὄψις, βλεφάροις αὐτὴν θυρῶσαι, ἃ, ὅταν μὲν αὐτῇ χρῆσθαί τι δέῃ, ἀναπετάννυται, ἐν δὲ τῷ ὕπνῳ συγκλείεται; ὡς δ᾽ ἂν μηδὲ ἄνεμοι βλάπτωσιν, ἠθμὸν βλεφαρίδας ἐμφῦσαι· ὀφρύσι τε ἀπογεισῶσαι τὰ ὑπὲρ τῶν ὀμμάτων, ὡς μηδ᾽ ὁ ἐκ τῆς κεφαλῆς ἱδρὼς κακουργῇ· τὸ δὲ τὴν ἀκοὴν δέχεσθαι μὲν πάσας φωνὰς, ἐμπίπλασθαι δὲ μήποτε· καὶ τοὺς μὲν πρόσθεν ὀδόντας πᾶσι ζώοις οἵους τέμνειν εἶναι, τοὺς δὲ γομφίους οἵους παρὰ τούτων δεξαμένους λεαίνειν· καὶ τὸ στόμα μὲν, δι᾽ οὗ ὧν ἐπιθυμεῖ τὰ ζῶα εἰςπέμπεται, πλησίον ὀφθαλμῶν καὶ ῥινῶν καταθεῖναι· ἐπεὶ δὲ τὰ ἀποχωροῦντα δυςχερῆ, ἀποστρέψαι τοὺς τούτων ὀχετοὺς, καὶ ἀπενεγκεῖν, ᾗ δυνατὸν προσωτάτω, ἀπὸ τῶν αἰσθήσεων· ταῦτα οὕτω προνοητικῶς πεπραγμένα, ἀπορεῖς, πότερα τύχης ἢ γνώμης ἔργα ἐστίν;—Οὐ μὰ τὸν Δί, ἔφη, ἀλλ᾽ οὕτω γε σκοπουμένῳ πάνυ ἔοικε ταῦτα σοφοῦ τινὸς δημιουργοῦ καὶ φιλοζώου τεχνήματι.

The following translation is, I hope, sufficiently close to convey a correct notion of the argument :—

S. *As some things have no character to mark the purpose of their being, while others are obviously made for* *use; which of these, think you, are works of accident, and which of design?*

A. *It is clear that things made for use must be works of design.*

S. *Does not then the Being who first made men, appear also to have given them the several organs of sense for their use—eyes to see things visible—ears to hear things audible? Moreover, what good should we have from smells, were nostrils not given us to inhale them? And what perception should we have of things sweet and tart, and of all the pleasures of the palate, had not a tongue been formed within the mouth to give us a discriminating taste of such matters? To pass on to other examples; think you not that it looks like the work of prescience, because the sight is delicate, to have guarded it with eye-lids, which open when we want to see, but shut when we go to sleep—to have fenced these lids with eye-lashes; which, like a sieve, strain the dusty wind and hinder it from hurting the eyes,—and over the eyes to have placed eye-brows, as eaves, to carry off the sweat of the brow from disturbing the sight:—again, to have given us ears capable of taking in all sounds without being ever crowded by them—in all animals to have placed the cutting teeth in front, and the molar teeth behind, fitted to grind down what they have received from the cutting teeth—and near the eyes and nostrils to have placed the mouth through which the food, each animal delights in, finds an entrance into its body—on the other hand, as the excretions are offensive, to have turned away the ducts by which they escape, and carried them off to the greatest possible distance from the senses:—can you doubt whether organs such as these, framed with so much forethought, are works of chance or of design?*

A. *No, in very truth, (said he,) I have no doubt; for, in this view, these various organs seem altogether the contrivance of some wise artificer who loves the beings he has created.*

I have quoted this passage in the hopes of inducing the reader to reconsider the whole chapter; both for its own value, and because it is in itself an ample refutation of an opinion unaccountably maintained by some writers, that the heathen philosophers of antiquity had no knowledge of God except what was derived through a corrupted tradition.

Were it true (which it certainly is not) that the heathen writers never argued from final causes to the being of a God, still we should not be justified in saying that the argument had no weight when handled by a Christian. Truths, whether physical or moral, are not less real because they have been hidden for many ages, and are only brought to light by the progress of other truths. No wonder that the truths of natural religion should have been oftener pressed by Christian than by heathen writers. The Christian makes them not the foundation of his faith. He seeks them not because he doubts, but because he believes: for they are the external means of communion with a being whom he is taught to love, and in whose more immediate presence he hopes hereafter to dwell. It is through these embodied truths, that in the mechanism of his own material frame, in the wonderful adaptation of his senses to the material world without, in the constitution of his mind whereby he learns the existence of intellectual natures like his own, in his power of modifying the order of events by the operations of his will, in his capacity of ascending from phenomena to laws, and of contemplating through them the marks of preordaining wisdom—it is through such truths as these that in all the world around him, in whatsoever manner his soul regards it, he is taught to read an everliving lesson of the benevolence and the power of God.

We think that we have some adequate knowledge of our fellow-beings, because they resemble what we have a consciousness of within ourselves. Without stopping to inquire how we come by this knowledge, let us suppose some one to ask how we come by the knowledge of a God: we can only reply, as has often been done before, that we know him by his works, animate and inanimate, and by the written revelations he has given of himself. Should however this interrogator go on to say, that God speaks not to us through his works, but only through the words of his revelation, wherein he told us from the beginning that *He created the heaven and the earth;* we may then retort another question, and ask, What knowledge could mere sounds like these convey through the ears to the heart, were there not already placed within it some knowledge of the being of a God; or at least were there not in the soul some natural and inborn power of rising to the apprehension of a general religious truth when presented to it in the form of a mere abstraction?

That our knowledge of God is in a certain sense inadequate, whether it be conveyed to us as a truth of natural or revealed religion, no one can for a moment doubt. It may be suited to our wants, but it can bear no measure to his glory. *No man hath seen God at any time,* because he is every where. And if he has sometimes, during the brief history of man, given a sensible manifestation of his more immediate presence, it has been by stripping himself (if I may so speak) of his attribute of ubiquity, and condescending to put on the semblance of some material power, or the glorified similitude of the human form. So also in the language of his written word, he is either described by negatives, or divested of his immaterial attributes, that he may be brought down to the grasp of human thought. Not only in the extent and power of his operations, but assuredly also in their very kind, he is infinitely above the reach of man's imagination. If revelation cannot, without a miracle, give to a blind man any knowledge of the sensations caused by the pulsation of light upon the eye; still less can it convey to the mind's eye any knowledge of God that is not limited by the conditions of our being.

Surely we may, then, believe that in religious knowledge there is much that is imperfectly comprehended: and if in the natural world each step of discovery bring to light new and unexpected truths, we may well believe that a revelation (expounding our moral condition in relation to God, and giving us a glimpse of our future destinies) must also bring to light something that is above reason—something that is new and unlooked for.

Let me not, however, be misunderstood. If revelation teach knowledge above reason, it does not thereby destroy the fair inductions of reason, otherwise the God of nature would be in contradiction with himself. A demonstration is not the less true because it is confined to its own premises: and if we deny the value of natural truth because of the narrowness of our faculties; we might, by like reasoning, set religious knowledge at naught, because it is limited by the conditions of our intellectual nature. In one word, whether we argue from man's ignorance or knowledge, we have no right to rob him of his inborn capacities—of the power of ascending from phenomena to the contemplation of laws, and of deducing general truths—of discerning the marks of designing wisdom in the universe—and of seeing that there is over all matter and all mind the will of a presiding God.

It may perhaps be well to consider some of the causes that have led men to reject the proofs of natural religion. One cause is the affectation of originality. "The proof of a Deity drawn from the constitution of nature, is not only popular but vulgar; and many minds are not so indisposed to any thing which can be offered to them, as they are to the *flatness* of being content with common reasons*." This remark of Paley's is applied to certain writers, who, to rid themselves of an intelligent Creator, have loaded natural history and physiology with the wildest and most preposterous hypotheses.

---

* *Natural Theology*, Chap. XXIII.

Another cause is ignorance of the laws of nature. Man is unwilling to think himself ignorant; and he naturally enough thinks lightly of the proofs he does not understand. Religious men may easily fall into this error: for their minds dwell on proofs not derived from any study of the material world, and they know full well, that the hopes and sanctions of natural religion are little fitted to satisfy the wants of man. Hence they reject it altogether. But they ought to know that the laws of nature, when properly understood, are records of the will of God, and are therefore fit matter for exalted study: and they have no right to argue from their own ignorance.

A third cause for rejecting natural religion is the reception of a narrow and false psychological system. This cause has, during the past century, tainted some of the best writings of the Ecclesiastical Members of our Church. Let us suppose some one to start with such propositions as the following: Knowledge is only a perception of the agreement and disagreement of our ideas—we can form no ideas without perception—and we have no perceptions, except through impressions on the organs of sense. If all this be taken for granted, he may soon go on to prove that, out of such beggarly elements, it is impossible to rise to any moral or religious truth; and therefore that all knowledge which is not physical, must be supernatural, and can come to us only by the teaching of revelation. Without stopping to ask whether man, if such were the whole of his immaterial powers, could be a fit recipient for any religious truth, or could ever comprehend it, we may ask the supporters of this hypothesis what account they have to give us of the thousand abstractions which, by our nature, we are compelled to form—of our moral sentiments—of the creative energies of the imagination—of the efforts by which we mount from individual phenomena to the comprehension of general laws, and of the skill by which we elicit from them unknown truths. There are incontestably, in the mind of man, innate capacities for the reception of knowledge according to the measure of his intellectual nature; and to these there are superadded innate active principles (absolutely distinct from the passive reception of impressions from without) whereby he is constrained to fashion the materials of thought into such forms as he is taught to seek after or his soul desires. These active principles are as much a part of the inner man as his eyes and his fingers are portions of the framework of his body. Religion takes these inner powers and capacities for granted. She appeals to them, sets them in a new movement, and makes them the levers of her strength; but she creates them not anew, any more than she gives to the outer body new limbs for motion and new senses for perception.

We know from our own experience two kinds of material changes—one chiefly dependent on the will of man—the other, as far as our senses are concerned, dependent on the mere qualities of matter. From the nature of an effect produced, we can also judge whether it be the result of mere material action, or a production of design and skill. Starting from these elements, we can ascend to the knowledge of a higher order of causation—of what we call material laws regulating a succession of material actions—and of a preordaining will manifesting its power in contrivance and adaptation. Whether we stop short, or whether we ascend to the highest truth, we are immeasurably above the reach of that narrow system of psychology which, in denying innate knowledge, deprives man also of those innate capacities and active powers whereby his whole knowledge is built up.

Those who start with a psychological foundation on which nothing can be built, and end by rejecting the moral sense, and the power of discerning God in the wonders of his creation, ought also (if they mean to be consistent) to deprive man of the capacity of apprehending general truth of every kind. Let them, however, look well to it, whether they do not contradict the plain declarations of the word of God; and whether, in mutilating the best faculties of man, they do not shut out from religion both its evidence and meaning. In plain truth, they cheat themselves by the mere jargon of metaphysics; and, without knowing it, they surrender one of the strongest outworks of religion to a cold and atheistical philosophy.

Lastly, some men have rejected natural religion through mere fanaticism. They believe our corruption to be so entire, that they deny to the natural man all perception of the beauty of moral truth—all knowledge of God—and almost shut out from him the faculty of reason. That the powers of natural reason are in a great measure independent of religious light is, however, certain from the fact—that some of the greatest discoveries in exact science have been made by men notoriously not religious. Again, religion herself appeals to reason, and has nothing whereon to rest, if we abrogate all the natural powers of reason. Were this the proper place for the discussion, we might say that man's depravity is in his heart—that it is shewn not so much in the dimness of his moral and intellectual vision, as in love of self, in impurity of thought, and in the want of an inherent power of struggling with temptation and keeping in order the fiercer passions. If we deprive man of all power of moral judgment, does he not cease to be responsible? and do we not seem at one breath both to impugn the justice of God, and to contradict his written word? But with the persons here considered, it is in vain to argue. They may, however, be open to an appeal of another kind. They may see in many Christian writings (for example, in the works of Dr. Chalmers and the late Robert Hall*) how possible it is for man to feel a deep conviction of the natural depravity of his heart, at the time that he has sublime and philosophic views of those moral and intellectual capacities he derives from God.

---

* In mentioning the name of Hall, I may, I hope, be permitted to state that on reading (now many years since) some of his admirable discourses, I first learned to doubt the truth of that system which regards utility as the test of moral right. At a time when this doctrine generally prevailed in England, he set himself against it, with a power

In conclusion, I may briefly notice an hypothesis, put forth, perhaps, in the hope of reconciling conflicting notions*. It assumes that we have no knowledge of God or his attributes from the light of nature: but when this knowledge has been given by revelation, it presumes that we can *then begin* to reason from natural phenomena, and confirm the truths of religion *by almost irresistible arguments, which may be deduced from every object around us.* Now this hypothesis labours, if I mistake not, under three insuperable difficulties. It has to explain away some of the clearest passages in the New Testament—it has to fight for a most untenable position: namely, that the heathen world knew nothing of God, except what first came through a corrupted tradition—and, lastly, it puts man in a new logical condition unsupported by any rational analogy. The inductions of natural religion are of a positive nature, and must be either true or false. If they be false, they cannot confirm what is true—if they be irresistibly true, then must their truth depend on their own proper evidence, and not on an extrinsic authority.

---

of moral reasoning—with a subtilty and fervid eloquence, which placed his works at once among the highest productions of the human mind. While this Discourse was printing, it was not my wish to look out for authorities; as that would have been but a vain and false affectation of research. But it would have been well to have fortified my feeble argument with some passages from the immortal works of Hall; and I cannot do better now, than refer the academic reader to them—especially to his two discourses entitled *Modern Infidelity considered*, and *Sentiments proper to the present Crisis*. In them both there is something of an academic cast; and for moral grandeur, for Christian truth, and for sublimity, we may doubt whether they have their match in the sacred oratory of any age or country.

* See the *Boyle Lecture*, Vol. II., by the Lord Bishop of Durham.

NOTE (H), p. 79.

MY object in this note is to bring forward, as briefly and distinctly as I can, though at the risk of repeating what has been stated before, some specific objections to Paley's *Principles of Moral and Political Philosophy.*

1. The first objection [illegible] the title of the work. If we reject the moral sense[illegible] overlook all the inherent capacities and active prin[illegible] whereby man becomes a responsible being; we depr[illegible]oral speculation of all the essentials of philosophy. It [illegible] however be said, that the objection is of small moment, [illegible]ovided Paley's ethical rules be true, and of general appli[illegible]n.

2. He first examines the rules of life by which men are ordinarily governed—*The Law of Honour—The Law of the Land—and the Scriptures.*

His account of the Law of Honour is both meagre and unphilosophical. It may be said, that he has a right to limit the meaning of his words as he thinks fit: but his definition partakes of the fault that taints all his system—it gives a rule, but overlooks the principle. The Law of Honour is not confined to rules of fashionable life. It is deep rooted in human nature—is felt by all beings from the savage to the monarch—and its power is implied in the very instinct which leads men to congregate in societies. Were man cut off from all regard to the opinion of those around him, he would be deprived of a principle planted in his breast by the hand of God, as a safeguard against what is base, and an incentive to what is great and good—The principle of honour may have been abused—may have led to much evil. But in that respect it shares but the common fate of all the principles of our wayward nature. All of them have been abused. Religion roots not out the elements of human nature, which are part of God's work: but she brings them under the law of obedience, and restores them to that place and office for which they were destined by the Author of our being.

In considering *the Law of the Land*, Paley points out, with great skill, some of its defects as a moral rule, but he overlooks a most important distinction. Laws are but expedients for the well-governing of particular states. They are founded in utility, and limited in their application. But moral rules are not so limited, neither have they the same foundation. This distinction seems both certain and obvious. We may further remark, that the expediency of a law must ever be held subordinate to moral rules: otherwise we only raise our social fabric, by dragging away the stones from its foundations.

Of the Scriptures he remarks, that in them *Morality is taught by general rules, occasionally illustrated by fictitious examples, or by such instances as actually presented themselves.* All this is true. The Bible is unquestionably not a formal book of casuistry: neither does it by any means supersede the importance of rules, founded in general expediency, for determining questions of social right between man and man. Many of our duties in society are artificial, and can only be ascertained by usage or positive enactment. But on questions of moral right, not only are the Scriptures the supreme authority in all cases where they contain specific declarations; but their maxims are ever directed through the affections to the moral sense: and I believe that any man who has studied them, and honestly acts upon their principles, is a thousand times more likely to determine rightly on any difficult moral point, than one who interrupts all the movements of his moral sense, and resolves not to decide till he has calculated the chances of utility.

3. Having already considered the argument by which Paley rejects the moral sense, I need not repeat what is stated in the preceding Discourse, (p. 57, &c.) His conclusion is, I think, untrue; and his reasoning is of no

weight, except for the intent of shewing the feeble sanction of mere moral rule.

In the ordinary course of life, men act through passion, affection, or habit. A good system of moral philosophy ought to analyze the active principles of our nature, and then shew their bearing on moral duties, and their subordination to the faculty whereby men know right from wrong. It may deal in general rules: [illegible] its rules are worse than nothing if not constructed wi[illegible]mediate reference to our moral capacities—in one w[illegible] if they do not ultimately rest on the supremacy of co[illegible]ce. A system that defines moral right by the standar[illegible]orldly utility, not merely leaves out of account the [illegible] active principles of our nature; but makes them wo[illegible]an nothing—a set of perturbations interfering with th[illegible]lm results of a dispassionate calculation. Such a system has no fitness for man's nature.

4. In an opening paragraph of the chapter on "Human Happiness," Paley writes as follows:—

I will omit much usual declamation on the dignity and capacity of our nature; the superiority of the soul to the body, of the rational to the animal part of our constitution; upon the worthiness, refinement, and delicacy, of some satisfactions, or the meanness, grossness, and sensuality, of others: because I hold that pleasures differ in nothing but in continuance and intensity.

With the early part of this sentence we may agree; for there has been much idle declamation against sensual pleasure. The sensualist will continue to act on his own feelings, of which he is the only judge; and we gain little by declaiming against his pleasures, and telling him they are worthless. But the concluding words are, I think, physiologically and psychologically untrue; and appear in direct antagonism with the happy train of moral sentiments, and the homely but manly wisdom which runs through the remaining parts of the chapter. They would have found their proper place in the scheme of a rank materialist, or in the essays of a heathen disciple of Epicurus.

(1). Pleasurable emotions, considered as mere physical phenomena (which seems to be Paley's view of the matter, in the words above quoted, and in the note affixed to the same page), differ in their origin. Some proceed from without, such as the grosser sensual pleasures: others from within, such as intellectual pleasures. As anatomists have proved that our sensations and volitions are conveyed to, and from, the mind by a separate nervous apparatus; we may, perhaps, conclude that the two classes of pleasures which are most widely separated in their modes of beginning, [illegible]e also separated anatomically in their whole development. It may be true that the pleasures of both these classes often shew themselves in kindred physical emotions; but we have no right, on that account, to confound things that differ, absolutely, as to their origin; and (I may add) which are manifested to the senses through the intervention of a distinct set of organs.

(2). Pleasures come under the rules of right and wrong; and have, therefore, a moral difference quite distinct from the continuance or intensity of our physical emotions.

(3). We have only to look into ourselves to see the monstrous incongruity of confounding intellectual, moral, and physical pleasures, and pretending to weigh them one against another on the nervous filaments of our bodies. We gain nothing by confounding things of a different kind under one general term, and then trying to draw out something like an arithmetical comparison between them. We can no more do this, to any good purpose, than we can weigh time on a balance, or teach a deaf man music by a scale of colours.

(4). Pleasures differ in their effects. Sensual pleasures are often of a mixed nature, and blended with the imagination; and, thereby, fasten on the memory, poison the springs of thought, and disorder all the movements of the will. But keeping to our idea of sensual pleasures in their simplest form, we may say of them generally—that they are of short duration—that they are soon forgotten—and that while we retain them in the memory we gain no profit from them. Intellectual and moral pleasures, connected as they ever must be with efforts of the mind and will, remain longer in the storehouse of the memory. But let no one say that, on this account only, they are better than pleasures which are merely sensual. For we may suppose a succession of intellectual and moral acts, each at the time accompanied by a strong emotion of innocent pleasure, to be afterwards blotted entirely from the memory. But their effects may remain (and such I believe to be a very common case) in an improved strength and capacity of the mind for what is great and good—derived from these very acts that are utterly forgotten. Herein, I think, exists a true, metaphysical distinction between intellectual and merely physical pleasure.

(5) Lastly, religious and devotional pleasures differ from all others. They most nearly resemble the pleasures we draw from the benevolent affections of our animal nature: but they differ from them in their origin, in their object, and in the support by which they are upheld.

The subjects, barely glanced at in these remarks, are both of great importance and great difficulty. Though we cannot, without mischief, pretend to compare together our different pleasures by any measured estimate of their intensity and duration; yet when viewed collectively we may judge of their value, by observing (as Paley himself has admirably done,) their ordinary effects, both physical and moral, on the character and condition of man.

5. *Virtue is the doing good to mankind, in obedience to the will of God and for the sake of everlasting happiness.* This is the definition adopted by Paley; and it is, I think, open to many grave objections.

In the first place, without straining its meaning beyond what the words can well bear, it does not include many important Christian virtues; such as self-denial, resignation to the will of God, and voluntary suffering for the sake of conscience. It may be said that these virtues indirectly benefit mankind: but the good of mankind is not, at least, their immediate object.—Again, a man may act well from habit or affection, without ever thinking of reward, either here or hereafter. Surely such actions cease not to be virtuous; yet they come not within the words of Paley's definition.—Lastly, if such be our definition of virtue, what becomes of the virtues of the heathen world—of men who knew nothing certain of a future state, and perhaps seldom thought of it? We know that they possessed a moral nature—that they reasoned correctly and beautifully on moral questions—that many of them acknowledged the supremacy of conscience—and that they sometimes performed heroic deeds of self-denial. Are we then, (for the sake of a mere moral definition) to blot out the recorded sentiments and actions of mankind—to destroy the distinction between good and evil—and to denounce all the deeds of the heathen world as violations of the law of nature, and moral wrongs, because performed by men, who, having no clear revelation of a future state, could not erect their rule of life upon its sanctions? In answering this question by a decided negative, I wish to fence myself against an objection which may rise in the minds of some religious men. I consider these as questions of morality, and not of religion. If it be from revelation only that we have any certain knowledge of a future state and of the conditions of our future acceptance, it must be from the records of revelation only that we can learn what are the qualities of the soul which are to fit it for the future presence of God.

Bishop Butler commences his *Dissertation on the Nature of Virtue*, with the following assertion: *That which renders beings capable of moral government is their having* *a moral nature, and moral faculties of perception and of action.* He soon after adds, *That however much men may have disputed about the nature of virtue, and whatever ground for doubt there may be about particulars; yet that in general there is an universally acknowledged standard of it. It is that which all ages and all countries have made a profession of in public: it is that which every man you meet puts on the shew of it: it is that which the primary and fundamental laws of all civil constitutions, over the face of the earth, make it their business and endeavour to enforce the practice of upon mankind: namely justice, veracity, and regard to the common good.* Here every thing remains indefinite: yet all the successive propositions have their meaning. The author knew well that the things he had to deal with were indefinite, and that he could not fetter them in the language of a formal definition, without violating their nature. But how small has been the number of moral writers who have understood the real value of this forbearance!

One great injury done to moral reasoning has arisen from an attempt to assimilate it too closely to the method of the exact sciences. By confounding moral with physical causation, and by considering moral motives as the necessary precursors of undeviating moral consequences, men have contrived to reach the most revolting and unnatural conclusions. They have denied to man all freedom of will, and liberty of action; and bound him up, physically and morally, in the fetters of an unrelenting fatalism. We know nothing of the inner movement of the soul except by consciousness—by reflecting on what passes within ourselves. In this way we learn that, within certain limits defined by the condition of our being, we have freedom of will and liberty of action; and our moral sense falls in with this belief, and teaches us that we are responsible for our choice between good and evil. Practically at least, we know that we are free, and the sophistry of man can never make us part with this knowledge[*]. To pretend, by any subtilties of inductive proof, to reach a psychological conclusion that interferes with those first elements which we know by internal consciousness, is not one atom less absurd, than it would be for a mechanical philosopher to mock us with the pretended proof of some physical law, while the law itself was falsified by the evidence of direct experiment.

Another great injury done to moral inquiries, has been the affectation not only of logical definitions, but of deductive proofs. Paley's system of morals is included in this remark. The subject has been hinted at above, and is so important that I may be permitted to return to it again[†]. There is in the human mind a passion for general truths, and a restless desire of deducing conclusions from first principles. This passion, while under controul, is a most valuable attribute of our intellectual nature: but it has sometimes done much mischief. In physical questions it has led men to grasp at generalizations beyond their reach, and to entrench themselves among hypotheses, while they ought to have been moving onwards among the foundations of knowledge, by the light of experiment. In moral questions, this passion has led men to false definitions and false opinions on the nature of virtue. An excellent but most paradoxical writer —not excluding (as Paley does) the moral sense in his estimate of right and wrong, but seeking for a definition to comprehend every act of moral obligation—ended by regarding virtue as a mere passion for the general good; or, in his own language, as, *benevolence to being in general*[‡]. But what, on such a definition as this, is to become of the private affections? They lead us to seek the happiness of certain individuals far more than that of other men; and therefore they militate against this rule of virtue. In severe science a rule which is found not to comprehend every particular case, is at once either limited or rejected. In like manner, unless we wish to surrender all the social affections—unless we wish to look on maternal love and all the train of blessed consequences following after it, as moral evils—we must reject this definition of virtue, and along with it the moral system of which it forms a part.

---

[*] Connected with this question, the Reader is requested to consult Butler's *Analogy*, Chap. VI. *Of the Opinion of Necessity considered as influencing Practice.*

[†] See above p. 77: and the end of Note (A), p. 101.

[‡] See *A Dissertation on the Nature of true Virtue*, in the works of President Edwards, Vol. II.

The domestic and private affections are the very channels through which the God of nature ordained man's benevolence first to flow. His happiness and social dignity are wound up in them; and deprived of them he becomes at once devoid of moral strength. To reject them, is to mutilate and not to elevate his moral nature; and is not a jot more wise than it would be for a philosopher to pluck out his eyes in the hopes of speculating with the greater clearness on the general properties of light. The general good of man is incontestably a noble object; but it can be promoted by those means only which God has given us. And those men have ever been found to follow this noble object most steadily and wisely, who have obeyed the laws of their moral nature, and fortified themselves by the practice of the humbler virtues first placed within their reach.

The author to whom I have just alluded saw not the obvious effects of his own principles. But bold and irreligious men were glad to follow them out, and to abide by their basest consequences. In their scheme all virtue merged into universal philanthropy—the private affections were but drains, carrying the waters of life away from their proper channel—marriage was a monopoly—patriotism a prejudice—and the common bonds of social life but the fetters of ignorance and intolerance.

This is a most pregnant instance of the mischief of general definitions and deductive reasoning in moral questions: and these remarks were suggested by some striking passages in Hall's discourse on *Modern Infidelity*, to which the reader is referred. Those who are interested in the inquiry would do well to consult also the *Dissertation on the Nature of true Virtue*, and the notes in which the Editor endeavours to vindicate the definition above quoted. The attempt, however, is to no purpose. In bad hands the definition has led to base consequences: and in no hands can it lead to any good, as it is not fitted to the nature of man. It is in vain to tell us that the love of our neighbour and our country, *if detached from a tendency of affection to universal being, is not truly virtuous—That attachment to an object, not founded on the comparative value of that object, belongs not to the nature of true virtue—That a heart enlarged to the love of being in general, includes all particular objects; and is then only capable of virtuous love* when the attachment to each object is *for the sake of the whole system of being*. There is, I repeat, neither truth nor practical wisdom in all this. The particular affections are virtuous, because they are manifestly in accordance with the will of God. By their exercise our higher capacities are matured; without their exercise, no moral virtue could ever germinate. Suppose a man to reach a higher grade of moral virtue; is he then called on to throw down the very scaffolding by which he mounted—to strip himself of all the feelings which have manifested themselves in his heart from the first dawnings of his moral nature? He is called on to make no such sacrifice: and were he called on, the sacrifice would be impossible*. High principle directs and controls the capacities and affections of our moral nature, but compels us not to root them out.

---

* Many other examples of the evil effects of *à priori* reasoning on moral questions might be found in the works of Jonathan Edwards. He was an acute, honest, and pious man, and a most intrepid reasoner: fearlessly accepting the conclusions (no matter how startling) to which he was carried by deductive reasoning from the principles he accepted. For an instance of this kind, I may refer the Reader to the new edition of his works, Vol. VII. p. 480. *London*, 1817.

6. Under the preceding heads, I have considered the principles laid down in the first book of Paley's Moral Philosophy. The fundamental propositions of his system are drawn out in the second book: but they have been examined in so much detail in the preceding Discourse, that it is unnecessary to go over the same ground again. Some one may, however, ask, how the principle of utility can be rejected, if such a well-digested moral system can be built upon it. We may reply as follows to such a question:

First. That in moral, as in physical philosophy, there has been no end to plausible hypotheses; and that the ingenuity of man has never wanted plausible arguments to support a system.

Secondly. That many parts of Paley's system relate to questions of (what may be called) legal ethics, having no other basis than the general good.

Thirdly. That it calls in the aid of Scripture rules—though these rules are not derived from principles in common with itself.

Fourthly. That God is a moral Governor of the world—or in other words, that the rules of conduct derived from man's moral nature, and from the declarations of the word of God, have a general *tendency* to secure our worldly happiness. But we have no right, on this account, to invert the order of our moral reasoning—to put consequence in the place of cause—to look only to the worldly effects of actions, and overlook their principles. Such a system places us in a false position, supposes us gifted with a power of tracing consequences which belongs not to our nature, blunts our perceptions of moral truth, and leads many men to make a wreck both of common principle and common sense. In natural history and natural philosophy, we see beautiful examples of contrivance and adaptation. But who would ever think of making contrivance the first principle of arrangement in natural history; or adaptation the foundation of physical science? In these sciences, at least, all men have acknowledged the necessity of separating primary cause from secondary consequence. And why should they not be bound by the same principles in moral reasoning?

7. In despite of a bad system, Paley was saved, by the rules he derived from Scripture (as well as by extraordinary good sense, and the kind feelings of his moral nature), from many great mistakes in the application of his principles. Sometimes, however, his system led him to play into the hands of bad men; and to take low grounds of reasoning, ill suited to the high tone of a Christian moralist. I will not dwell at any length on examples of this kind: but it is important for my present object to point out some of them.

(1). The first example of the base conclusions of a utilitarian system of morals, occurs among the practical observations in the chapter on Virtue. It is only necessary in this place to request the reader to reperuse the remarks at p. 66 of this Discourse, as well as the note affixed to it.

(2). A most offensive instance of sacrificing common honesty and common sense to nothing better than utilitarian special pleading, may be seen in Book III. Chap. xxii. on *Subscription to Articles of Religion.* These Articles may be true or may be false—to demand our subscription to them may be wise or unwise—these are not the questions. But shall a man seek the emoluments of a sacred office, and pledge himself before God to perform the duties of it in conformity with the word and spirit of these Articles, and then forget them altogether, or try to blind his conscience by poring over the *inky blots and rotten parchment bonds* that are piled among the archives of our parliament? An act of parliament may give the legal sanction to these Articles; but it gives them not their meaning; which can be found only in the vulgar way of honest interpretation. The preceding instances are taken from the moral part of Paley's work. The following are derived from the political part; where the principle of utility may (for obvious reasons) be applied with much more safety, and sometimes with great advantage.

(3). Why is it our duty to obey the civil government? Paley replies, *because it is the will of God as collected from expediency......so long as the established government cannot be resisted or changed without public inconveniency, it is the will of God that the established government be obeyed—and no longer. This principle being admitted, the justice of every particular case of resistance is reduced to a computation of the quantity of danger and grievance on one side, and of the probability and expense of redressing it on the other. But who shall judge of this? We answer, every man for himself**. A more loose and mischievous doctrine—one more certain to be turned to base purposes by bad men—was never, I believe, upheld by any Christian moralist. In times of excitement, men are too much blinded by passion ever to enter fairly on a computation of civil grievance: and as for danger—brave men of sanguine tempers are not restrained by it, but on the contrary, are urged by it into action. On Paley's principles, civil obedience cannot continue to be regarded as a duty: and if civil order be retained at all, it can only be through selfishness and fear on the one hand, and by corruption and brute force on the other. Such a state of things can only lead to ruin and confusion, or the establishment of a despotic executive.

An unbeliever may ground his duty of obedience in expediency: but a Christian finds, in the word of God, a ready answer to the question we started with. Obedience to the civil governmenment is a duty, because the word of God solemnly and repeatedly enjoins it. But does this doctrine lead us to the slavish maxims of *non-resistance*

---

* *Moral and Political Philosophy*, Book vi. Chap. iii.

and passive obedience? Undoubtedly not. The Apostles of our religion gave us an example and a rule for the resistance of a Christian. They resisted not the powers of the world by bodily force; but by persuasion, by patient endurance, and by heroic self-devotion: and the moral and civil revolutions, which they and their followers effected, were incomparably the most astonishing that are recorded in the history of man.

Should it, however, be said, that ordinary men, not having the powers given to the inspired Apostles, must, on that account, adopt less exalted maxims as their rules of life; we may state in general terms (without loading this discussion with extreme cases which lead to no practical good in moral speculation), that where the Christian religion prevails in its purity, it is impossible there should ever exist an unmitigated despotism; and where the power of the executive is limited (in however small a degree) there will always be found within the constitution some place where the encroachments of bad and despotic men may be met by a moral and legal resistance. Rebellion is proscribed by human law, and is forbidden by the law of God. But a moral opposition to the executive, conducted on constitutional grounds, is proscribed by no law, either of God or man: and if it be wisely and virtuously carried on, it has in its own nature the elements of increasing strength, and must at length be irresistible. If, however, during the progress of a state, the constituted authorities be in open warfare with each other, a good man may at length be compelled to take a side, and reluctantly to draw his sword in defence of the best inheritance of his country. Such an appeal, to be just, must be made on principle, and after all other honest means have been tried in vain.

Unfortunately, the opposition to the encroachments of arbitrary power has too often been commenced by selfish men for base purposes. Instead of taking their stand in a moral and constitutional resistance—instead of trying, by every human means, to concentrate all the might of virtue and high principle on their side, they have broken the laws of their country, dipped their hands in blood, and needlessly brought ruin on themselves and their party. The vices of the subject are not only the despot's plea, but the despot's strength. Where the virtuous elements of social order are wanting in the state, whether men be willing slaves or not, they are unfit for freedom.

(4). In the Chapter *On the British Constitution*[*] we may, I think, find some examples of mere utilitarian reasoning, where the author ought (in part at least) to have taken the higher ground of a moral philosopher. It is impossible to deny that there is in this chapter much good sense and sound reasoning. Reviewing the popular part of our constitution, he points out the vast advantages we have derived from it, and the contingent evils of any material change in the system of popular representation. But, the corruption—the perjury—the baseness connected with the system—the mean shifts to which great men were compelled by it to stoop—the chance that the very fountains of law and honour might become polluted by it—the never-failing topics of offence it held out to discontented and designing men—these things are all passed over, though in the eyes of some they seemed to form a deadly canker in the state. Had he considered these flagrant evils, and then shewn that, while men continue what they are—little better than the slaves of their bad passions—any other system might bring along with it, as great, or perhaps greater, moral evils, he had done well. His conclusions might have been right or wrong; but his argument would have been not only more complete, but placed on higher and truer grounds.—I am offering no opinion on any subject discussed in this chapter; the attempt would be entirely out of place in this note: my object is, not to examine the weight of Paley's arguments, but his tone of arguing.

---

[*] *Moral and Political Philosophy*, Book VI. Chap. vii.

(5). Near the end of the Chapter *On Crimes and Punishments*, is the following sentence[*]: *Another maxim which deserves examination, is this:—"That it is better that ten guilty persons escape, than that one innocent man should suffer." If by saying it is better, be meant that it is more for the public advantage, the proposition, I think, cannot be maintained.* It would, I believe, be an easy task to prove that this conclusion is wrong on Paley's own principles. We are, at least, certain that it contradicts the moral feelings of mankind, and this is quite enough to condemn it.

No man perhaps ever used the disjunctive form of reasoning with more advantage than Paley. It sometimes however led him into error. The worst example of this kind has been considered in a former page of this Discourse[†]: another occurs in the chapter just quoted. *There are* (he observes) *two methods of administering penal justice—The first method assigns capital punishments to few offences, and inflicts it invariably—The second method assigns capital punishments to many kinds of offences, but inflicts it only upon a few examples of each kind.* All this is true; but when he argues as if there never had been, or could be, any other methods besides these two; his conclusions (whether true or false) are not derived from any rules of sound logic, and are open to a charge of sophistry. This last remark is not however of much importance, and bears not directly on my present object.

From all that has been stated above, we may conclude, that Paley was wrong in overlooking the innate moral capacities of our nature—that the principle of utility is derived from false reasoning—that it places man in a false position—lowers his standard of right and wrong—and inevitably leads him, whether in speculation or practice, into false and unhallowed consequences. In accepting these conclusions, we merely assume, that man has a moral nature; and that, in almost every act of his life, his perception of right and wrong is incomparably clearer than his knowledge of the general consequences that may follow from the act itself.

---

[*] *Moral and Political Philosophy*, Book VI. Chap. IX.

[†] See above, p. 60.

SUPPLEMENT TO THE APPENDIX,

CONTAINING

A SERIES OF NOTES TO THE PREFACE.

An unhappy fatality seems to hang over the publication of this Volume. Not many days after the concluding note to the Preface of this Edition was printed the Author went out of College; but he returned about a week afterwards, for the express purpose of passing the following Supplement to the Appendix through the Press, during the Christmas vacation; for he was anxious that the Volume should be out by the beginning of the Lent Term. But very soon after his return he met with a painful and dangerous accident, which for five months made him unfit for any continued intellectual labour: and he now resumes his task, though still crippled in his right arm, and anxious on many accounts to make the following supplementary Notes as short as he can without obscuring their meaning.

Trinity College,
May 20, 1850.

No. I.

Additional Remarks on the Nebular Hypothesis.

(p. ix. and p. xxi.)

It may have appeared strange to the reader of note D, that no allusion is made in it to *The Telescopic Survey of the whole surface of the visible Heavens,* by Sir John Herschel. The note was, however, printed several months before the first appearance of that great work. *Supra,* p. cccxxxiii., and note to p. ccccxli.

On reconsidering note D, I find that I have expressed myself inaccurately in referring to the ecliptic as if it were La Place's *invariable plane* of the Solar System. The ecliptic is, in fact, inclined to that plane at an angle of

1° 35′, and not one of the planetary orbits coincides exactly with it. On the Nebular Hypothesis, we must suppose that the equator of the revolving Nebula was very nearly coincident with the *invariable plane:* for the successive nebular rings must have been thrown off from the equator of the revolving mass; and the different inclinations of the resulting planetary orbits to the *invariable plane* must have been caused by subsequent perturbation.

When the following Discourse was first printed, I was a believer in the Nebular Hypothesis; not only because it lent itself to the mechanical explanation of many phenomena in the solar system; but also because it seemed (after the discoveries of Sir William Herschel) to be a *vera causa*; or, at least, to be supported by good analogical evidence drawn from the phenomena in the remote regions of the visible heavens (*infra*, p. 27). But the discoveries of Lord Rosse have very greatly weakened, if they have not altogether destroyed, these assumed analogies of condensing nebulæ. So many of the nebulæ are now resolved that we are almost constrained to believe that all of them might be resolved had we instruments of sufficient optical power. Nor is this our only difficulty. The luminous points of the resolved nebulæ have no arrangement indicating the condensation of a nebulous mass about distinct centres, by any force resembling that of gravity. Several of them exhibit, in Lord Rosse's figures, a kind of complicated spiral arrangement, which it is impossible to see, pictorially represented, without referring it in imagination to some great physical cause—some mighty vortices in the remotest regions of the sky. Without indulging in idle speculation, we may at least affirm, that the grouping of the luminous points in the resolved nebulæ is quite abhorrent from any conception we can form of a nebular mass in a gradual progress of condensation.

The arguments, both for and against the Nebular Hypothesis, have, perhaps, been given at sufficient length in note

D: but I may be permitted to state, more distinctly and technically than is done in that note, some of the difficulties we meet with in attempting to reconcile the hypothesis to the well-known phenomena of the solar system.

1. The time of the Sun's rotation round its axis is 25 days 10 hours, nearly; and the periodic time of Mercury is nearly 88 days. When that nebulous ring was thrown off, out of the consolidation of which (on the hypothesis) came the planet Mercury, the great solar nebula must have been revolving in 88 days nearly. Now there is a mechanical principle (technically called the *conservation of areas*) whereby mathematicians are able to determine approximately the velocity of rotation belonging to every subsequent period of contraction of the solar nebula, provided they know the composition of its mass, or the law of its density, and the time of its rotation corresponding to any given magnitude of its diameter. And reasoning on this principle, they would (on any purely Nebular Hypothesis) expect a very much greater velocity of rotation than that which is exhibited in the Sun's period of 25 days 10 hours. This difficulty is fully admitted in an article of the *Quarterly Review*, attributed to Sir John Herschel. But it is not insuperable; for we may believe it probable, that *before* the nebulous ring of Mercury was thrown off, the greater part of the Sun's mass was already consolidated near its centre; and hence, that the law of "the conservation of areas" might be kept entire, while the remaining nebulous portion gradually contracted towards the surface of the Sun; and that all this might be effected without giving the Sun a greater velocity of rotation than we find by actual observation.

2. There are other difficulties presented by the Sun and Mercury. The axis of nebular rotation could not change during contraction. The equator of the Sun and the orbit of Mercury ought therefore nearly to coincide with the *invariable plane* of the solar system: but they do not nearly coincide with it. The Sun's equator is inclined to

the ecliptic at an angle of 7° 14′, and the orbit of Mercury at an angle of 7°, nearly. From these numbers we may deduce two angles of inclination to the *invariable plane* that cannot be well accounted for by perturbation. Again, the longitude of the ascending node of the Sun's equator is about 80°: but the longitude of the corresponding node of the orbit of Mercury is 45° 58′. Combining these positions of the nodes with the angles above mentioned, we also infer that the plane of the orbit of Mercury is not nearly coincident with the Sun's equator, as it ought to be on the Nebular Hypothesis.

3. The orbits of some of the other planets are still more anomalous. The orbit of Pallas is inclined to the ecliptic at 34° and a half, and at 34° to the "invariable plane." The orbit of Ceres is inclined to the same plane at more than 10°. These numbers seem to be incompatible with a simple Nebular Hypothesis. They are, at least, far too great to be accounted for by mere planetary perturbation.

4. On the Nebular Hypothesis, all the planets were first thrown off as circular rings; and after condensation they ought not only to move nearly in the "invariable plane," but they ought also to move in nearly circular orbits. The eccentricity of Mercury is, however, more than one-fifth; that of Juno is more than one-fourth; that of Pallas a little less than one-fourth. These numbers are far too great to be explained by mere perturbation. They require the intervention of some additional hypothesis.

5. If Venus was first thrown off as a nebulous ring having its plane nearly coincident with the *invariable plane*, how comes it to pass that the axis about which Venus revolves should coincide nearly with the plane of the ecliptic? The position of the axis of this planet is twisted almost 90° out of the place in which we should expect to find it on the Nebular Hypothesis.

6. Compatibly with the same hypothesis, how comes the axis of the earth to be inclined to the ecliptic at 23° 30′?

And, again, if the Moon was thrown off during the contraction of the nebulous earth, it must have been thrown off at the equator of the revolving mass. How, then, comes it to pass that the orbit of the Moon (which is inclined to the ecliptic at an angle only of 5°) does not much more nearly coincide with the actual equatorial plane of the earth? These discrepancies are much too great to be accounted for by perturbation.

7. Difficulties of a like kind are presented by other planets. Thus, the ring of Saturn is inclined 28° 40′ to the ecliptic. The nearer satellites of Saturn are nearly in the plane of its ring—the most distant satellite is nearly in the plane of the ecliptic. Again, the satellite of Neptune moves in an orbit that is inclined to the ecliptic at an angle of more than 30°. Surely these numbers throw very great difficulties in the way of those who receive the Nebular Hypothesis.

8. The orbits of the satellites of Uranus are almost perpendicular to the ecliptic; and their motions, when projected on the ecliptic plane, are retrograde. The positions of these orbits, and the directions of these motions, are therefore in most perfect antagonism with the Nebular Hypothesis: and the explanation of these phenomena attempted by the author of the *Vestiges*, only shews the loose manner in which a man, who is not well acquainted with mechanical philosophy, will deal with facts and first principles. It is, mechanically, inapplicable and worthless.

9. If the returning Comets be considered as an original part of the Solar System, they in no respect conform to the Nebular Hypothesis: for their orbits are, in general, very highly inclined to the ecliptic plane; some of them (*e.g.* Halley's famous Comet) are retrograde; and all of them move in very eccentric orbits. In whatsoever way our system may have originated, it seems however best to regard the Comets as stray bodies, out of all strict analogy, either of composition or origin, with the Planets:—as bodies that

have perhaps been caught by the attraction of the Sun and Planets and brought within our System during its motion through sidereal space.

Professor Plateau's experiments practically illustrate the truth of La Place's dynamical reasoning on one part of the Nebular Hypothesis. To a person who is unacquainted with the principles of mechanical philosophy, these experiments may give, through his senses, an evidence he did not comprehend before: but they give no new evidence to one who is acquainted with exact mechanical science: for La Place's dynamical reasoning stood in no need of experimental illustration, and was universally admitted as true. But the truth of La Place's reasoning is no proof of the hypothesis that suggested it: for there arise such questions as these. (1) Is there any evidence, based in fact or analogy, to prove that the solar system ever did exist as a revolving nebula? (2) Do the changes of a condensing nebula explain the phenomena of the solar system? To these questions we are compelled, in the present state of our information, to give a negative reply. I hardly need add, that M. Comte's reasoning on this subject (though quoted with praise by more than one writer) is utterly worthless; inasmuch as it involves a palpable sophism.

Are we then to reject the Nebular Hypothesis altogether? This I venture not to affirm; for it does lend itself to many phenomena of our system, and it seems to contain some elements of truth that should not be overlooked. Humboldt, in his *Kosmos*, seems to regard it as a well-established theory; and some of the greatest mechanical philosophers of the present day still look on it with favour. What I contend for is—that we have, at present, no right to accept it as a theory which is demonstrated, or as the foundation of any general reasoning on the System of Nature.

An American astronomer has endeavoured to establish some new and remarkable analogies in the Solar System, involving the masses of the Planets, their distances, and their times of rotation. I shall return to this subject in a following note (No. VII.); and I only remark by the way, that should these analogies be hereafter so far confirmed as to become an accepted law of our System, they seem not to have any very obvious bearing on the hypothesis discussed in this Note.

No. II.

On Animal Creations by Galvanism.

(p. xxv.)

WHAT are we called on to believe when we are told of the galvanic creation of an Acarus? That galvanic forces can, without the help of any pre-existing vital germ, at once assemble together the particles of dead matter, and arrange them in the complicated organic structure of an Acarus; and that the same forces can give this organic structure all the attributes of life, and the powers of reproduction. We know something of elective affinities, and we can modify these affinities by new modes of galvanic action. We can produce definite compounds, and definite crystalline forms, out of the definite combinations of dead and inorganic particles. But the formation, in this way, of a complicated organic structure is nothing less than a miracle, unless we suppose the pre-existence of some vital germ among the particles on which we experiment: for it refers to one system of causation effects that are most widely apart in all their manifestations; and it is utterly abhorrent from all our experimental conceptions of chemical action and molecular arrangement.

I do not believe that galvanic action can give any of the true attributes of life to the particles of dead and inorganic matter: and if (only for the sake of argument) we were to give up this point, and assume at once—with Lamarck, Oken, and other materialists—that organic life may begin by the direct action of the galvanic fluid on certain gelatinous forms of matter that is dead and inorganic, what should we gain by the assumption? On this assumption, life begins only in the very lowest organic forms of nature, multiplies afterwards by fissiparous generation, and then rises gradually on some line, or lines, of the organic scale, by progressive development. On no sane view of this theory can we produce an Acarus experimentally from dead matter without a long ascending process of development—a process implying many specific transmutations, and many transcendental leaps from Order to Order. To derive an Acarus at once from inorganic matter is, therefore, just as abhorrent from any rational view of the theory of development, as it is abhorrent from any known law of atomic combination.

That there are difficulties in accounting for the generation of some of the very humble forms of organic life, no one pretends to deny. It is surely the part of wisdom to be guided, in all such cases, by the analogies that are presented to us by other parts of nature which are neither obscure nor doubtful. In this view, we do not reject, but we vindicate, the grand uniformity in the organic laws of nature. At any rate there is no wisdom in explaining the obscurest phenomena of organic life by hypotheses which utterly shut out the light given to us by the help of analogy.

Multiplied blunders were made by those who first told us of the galvanic creation of an Acarus. Its species was mistaken—its exuviæ were mistaken for its ova. It was affirmed that its ova could not be transported through the air because of their size and gravity. Other spurious organic creations were asserted, &c. &c. The transporting power of the air is sufficient to bear bodies, that are specifically heavy (provided they be in a state of great comminution), to vast distances. The air teems with the invisible seeds of animal and vegetable life, that are borne mechanically on its wings, and begin to germinate the moment they fall on a spot fitted to call forth their organic functions. The specifically heavy siliceous castings of microscopic Infusoria are probably borne, as we learn from Ehrenberg, across the Atlantic to the coasts of Africa and Europe; and they are certainly borne, in millions of millions, from the interior of Africa to the southern coasts of France and Italy. This transporting power of the air at once explains many of the supposed cases of spontaneous generation.

Again, we know that some of the lower forms of the animal kingdom are so tenacious of life that they will endure, without vital injury, the extreme temperatures of boiling water and long-continued polar frost: and we also know that the ova of these low animals are far more tenacious of life than the animals themselves. In such facts as these we have an explanation of many cases of supposed spontaneous generation, and of experiments that pretend to teach us conclusions that violate all our experimental knowledge of molecular action, and all the best analogies of the living world.

No. III.

On the Placoïd and Ganoïd Fishes of the Palæozoic Strata, and their places in the Organic Scale.

(*Supra*, p. lxv. p. lxxi. and p. cccxxiii.)

The claims of the Cestracion (to which some of the oldest fossil fishes are very nearly allied) to a high rank in the scale of its Class, rest on the following facts:

1. Its *cerebellum* is absolutely and relatively larger than in the great bulk either of osseous or of cyclostomous Fishes; and its *cerebrum* is absolutely and relatively larger than in any osseous or cyclostomous Fish.

2. Its heart approaches close to the condition of a low form of Reptile-heart; for its *bulbus arteriosus* is large and muscular; and it has rows of valves like those of the, so-called, Sauroid Fishes.

3. Its organs of reproduction are of a high organic grade; far higher than in any osseous Fishes. In one sex it has distinct and compact *testes*, *vesiculæ seminales*, and *claspers*. In the other sex, the *oviduct* is distinct from the *ovarium;* and it has the *morsus diaboli*, as well as the *nidamental gland*.

4. Its jaws are *terminal*, and its teeth, being fitted both for prehension and mastication, are superior to those of ordinary Plagiostomes.

5. The above characters are taken, almost word for word, from Professor Owen; and to them we may add, the position of the fins, which put the whole skeleton in symmetry with that of a Reptile or a Mammal. This last point is well urged by Mr. Hugh Miller, *Footprints of the Creator*, p. 153, and p. 160, &c.

6. Not to dwell exclusively on the Cestracion, we may assert generally, that all the higher forms of cartilaginous Fishes (Sharks, &c.) have a very high organic grade in their Class, determined collectively from their brain and nervous system, their heart and arterial system, from their organs of reproduction, from their whole economy of gestation and parturition, and from their functions during life.

7. Again, not dwelling exclusively on the Cestracion, we may add, "that the highest forms of cartilaginous Fishes are brought into connexion with Amphibious Reptiles by the existence of temporary gills, which disappear while these Fishes are in an early embryo state. These temporary gills, similar in function to the temporary respiratory tufts of certain Amphibious Reptiles (*e. g.* Frog and Salamander), seem (together with other points of analogy) to connect the cartilaginous Fishes with the Amphibia. They are seen in the *Squalus* and *Raia*, in the *Pristis* and *Torpedo*,

all of which are *ovoviviparous;* and (regarding these gills teleologically) they seem to be for the purpose of respiration while the creature is surrounded by the gelatinous fluid of the oviduct." (*Note by Dr. Clark*).

On the whole then,—taking for our guide the brain, the heart, the organs of reproduction, the symmetry of the whole skeleton, the locomotive power, and the despotic office of the higher cartilaginous Fishes in the economy of nature, —we are compelled to place them on the very summit of their Class. At one end of the scale of cartilaginous Fishes are certain species (such as the Cyclostomes) which descend lower than any hard-boned Fishes: but at the other end of the scale, the cartilaginous type ascends higher, beyond comparison, than any hard-boned species of the whole Ichthyic Class: and if, on the development theory, a transition is to be made from Fishes to Reptiles, it must be made through the higher cartilaginous Fishes. But the chronological history of the Class entirely stultifies the theory of development; by proving, on the evidence of geology, that the very highest types were called into being first, while Fishes were the despots of creation; and that, afterwards, they not merely lost their place at the head of organic creation, but that the collective Class, so far as it was increased by the accession of new Orders and Genera, was developed on a degraded pattern.

Against this conclusion it has been argued, that most of the high cartilaginous Fishes are plagiostomous. True! and this embryonic character may be one mark of inferiority among Fishes on the same line of ascent, and nearly on the same grade. It might, for example, be one reason for putting a common Shark below a Cestracion. But it offers by itself no proof of inferiority, when Fishes far apart, and on a different line of ascent, are compared together; and their organic grade determined by such collective characters as are above enumerated. Embryonic development may suggest, or confirm, some good principles of classification;—it may explain the place and meaning of certain organs among animals of a kindred grade: but we should monstrously abuse its application, if we set it up against the collective evidence of the fully-developed organs of the perfect animal. It has suggested to some minds the theory of development; and some of those who have accepted the theory, have clung to embryonic evidence, against all reason, and against the evidence of pregnant facts, which shew how utterly inapplicable it is as a sole guiding principle of classification.

Most of all is the embryonic argument pushed out of its legitimate application, and utterly puerile and absurd, when two animals, far apart in their organic structure, have their place on the scale fixed by the embryonic type of a single organ. For it is well known to physiologists, and is proved by examples quoted in the *Edinburgh Review*, and in the *Footprints of the Creator*, that organs of the first importance in the animal economy are, in some instances, degraded, or entirely obliterated, in the progress of a single being from the larva type to its complete development. Again, it has been urged that the higher cartilaginous Placoids have *heterocercal* tails (like that of a salmon's embryo), and are therefore of an organization below the hard-boned fishes. It is true that they have heterocercal tails; but who would determine a fish's place on the scale by a single organ, while he studiously keeps out of sight the brain, the heart, the sexual system, the animal symmetry, and the whole vital economy? Neither is it true that (regarding the whole scale of nature) the heterocercal tail is a mark of degradation. On the contrary, so far as it goes, it is, when seen in a Fish, a mark of nobility: for the heterocercal tail is very closely analogous to the tail of a Reptile and a Mammal. The tail of a Shark is *very closely* analogous to the tail, for example, of an Ichthyosaurus; while the homocercal tail of hard-boned Fishes is out of all near analogy with the tails of any animals of the higher Classes.

Lastly, we have this other precious argument thrown into the balance. The very low Cyclostomous Fishes are cartilaginous; and Sharks and Cestracions are cartilaginous: therefore Sharks and Cestracions are of a low type, and fall below the hard-boned fishes! It is hard to believe that such a sophism could have been used for any purpose but that of throwing dust in the reader's eyes. If its author has used it in sincerity, there is then an end of all argument; and we can only, in mercy, recommend him without delay to seek for cerebral renovation by a voyage to Anticyra.

I here suppress several pages of a discussion I had drawn out on the organic grades of the Palæozoic Ganoids (see note to p. lxxi. and p. cccxxiii.), as they appear among the remains of the old red sandstone and carboniferous rocks: for the subject has now been amply treated in the *Footprints of the Creator*, and to that work I refer the reader. As, however, the terms *homocercal tail* and *heterocercal tail* have been mentioned, it may, perhaps, be well to explain, in a few sentences, what these terms mean, without asking the reader to consult any other book. In the *heterocercal type*, the back-bone tapers to a point (in accordance to a common Lacertian type), but is abruptly bent upwards at its extremity. The upper surface of the tail is generally fortified with strong elongated scales called *fulcral rays*: but it has no true caudal rays interpolated among the upper, or neurapophyses. The under side of the tail has, however, a series of true rays interpolated among the under, or hœmapophyses; and as these rays gradually shorten towards the extreme caudal vertebræ, they form collectively a cartilaginous caudal fin. In the *homocercal tail* the back-bone of the fish diverges greatly from the Reptile type. It does not converge to a point, but at its extremity we find an enlarged, anomalous, and laterally compressed vertebral mass; from the outer edge of which proceed all the caudal rays, so as to form a nearly equal lobed tail in a vertical plane. Such is the tail of a trout or a herring.

In many of the Ganoids we have a back-bone converging to a point without being turned upwards; and, so far, on the true Lacertian type; and many of the same Fishes have true caudal rays interpolated among both sets of the apophyses, above and below, so as to have a double-lobed tail, of which the lower lobe is generally larger than the upper. This Professor M'Coy calls the *diphycercal tail.* It is certainly of such a distinct structure as to deserve an anatomical name: and it probably comes very near the Enaliosaurian tail. There are other caudal varieties on which I must not dwell; and I may again refer to the *Footprints of the Creator*, pp. 171, 173, and to the excellent figures and descriptions of the *homocercal* and *heterocercal* structures there given.

Another point I may also touch upon before I conclude this note. Nearly three years since Professor M'Coy pointed out to me the spiral structure of certain coprolites of Ganoid Fishes, in our Museum, derived from the old red sandstone and carboniferous rocks. The structure proved that these Fishes must have had intestinal valves—and he further remarked, that all Ganoids with intestinal valves had also (as had been proved by Müller) a muscular *bulbus arteriosus* with an apparatus of valves, that brought the heart close to the Amphibian type. Thus, from what, at first sight, might be looked on as an obscure and worthless fossil, we obtain a very important step in our estimation of the organic grade of a very large division of the Palæozoic Fishes.

In justice to Professor M'Coy (who has been involved in some controversy on subjects here alluded to), I subjoin, in his own words, a Note which he left with me before he commenced his new duties at Belfast; and I may remark, that it partly takes the place of the comments which I have suppressed.

Note by Professor M'Coy, *on the place, in the organic scale, of the Palæozoic Ganoid Fishes.*

"The popular impression that all the Fishes of the Palæozoic rocks belong to a low organic type, and that in the oldest strata in which *perfect* remains of Fishes occur, (the old red sandstone), we have stereotyped, as it were, the 'embryonic' stage of development of Fishes as a Class, seems to have originated in two interesting and important statements of Prof. Agassiz:—

"1st. That all the ganoids of the Palæozoic Rocks differed from those of the newer periods in having 'heterocercal' tails—that is, the body tapered gradually to a point, and *ran to the upper angle* of the tail, the caudal fins being only developed from the under side; a structure which he remarked existed in the embryo of the 'homocercal' salmon, &c.

"2nd. That in the Devonian fishes the vertebral column (observed in the *Coccosteus latus*) was not composed of separate ossified vertebræ, but consisted of a continuous cartilaginous (or rather mucous) cord, as in the embryo condition of bony fishes; the spinous processes alone being separately ossified. I do not suppose Prof. Agassiz meant those laws to be accepted so literally and extended so widely as they have been by some geologists; for, in the first place, heterocercal Ganoids occur as high as the top of the Oolites (*e.g.* the *Coccolepis Bucklandi* of the Solenhofen schists); but, at any rate, both positions are clearly disproved by specimens from the old red sandstone, in the Cambridge University Collection.

"To begin with the first position: we have the whole of that great group to which I gave the name *Placodermata* (including *Pterichthys*, *Coccosteus*, &c.) in which the tail tapers to a simple point without any caudal fin, almost meriting the name 'acercal.' But of those with developed tails we find all the species of one of the most abundant and well-preserved genera, *Diplopterus*, (though described in both of Prof. Agassiz's works on fossil Fishes as having 'heterocercal' tails, and figured in the last work, Plate E of restored outlines, as identical in the form of their tails with the 'heterocercal' *Osteolepis* and *Dipterus* on the same plate), to have really a very different structure, to which (in the *Annals of Nat. Hist.* for Nov. 1848) I gave the name 'diphycercal,' (from διφυής—*duas habens naturas*, and κέρκος—*cauda*). In these, as in the 'homocercal' types, the body is nearly medial, or with a scarcely perceptible upward deflexion; and there is nearly as great an expanse of caudal fin above as below: but it differs from the *homocercal* Fishes in having, like the 'heterocercal,' the body tapering gradually to a point; and the fin-rays obviously must have been intercalated with the spinous processes of a great number of the caudal vertebræ, instead of being connected with the short terminal mass only. It is obvious that we cannot anatomically regard this as a homocercal tail, although it most nearly approaches it in appearance.

"Precisely the same construction of tail is found in all the species of another Devonian genus, to which I have given the name *Gyroptychius*, both genera having rhomboidal caudal fins, with a nearly medial point towards which the attenuated body runs.

"As to the second position, the vertebral column is not always a continuous soft cord, as is proved by a new species of *Coccosteus* in the Cambridge collection, which I have called *C. microspondylus*, which has all the bodies of the vertebræ as separate, and as distinctly ossified, as their spinous processes; these latter being in proportion much smaller than in the *C. latus* (Ag.)

"As further disproving this notion of the general degradation of the Palæozoic fishes, it is worthy of note that the coprolites which have been found are marked by the spiral grooves indicative of a spiral valve in their intestines, which, according to the numerous recent dissections of Prof. Müller, of Berlin, invariably co-exists with a true *muscular bulbus arteriosus* with a power of forcible contraction, and a complex system of valves enabling it to perform the function of a second auricle to the heart, as in sharks and higher animals. We have here then an unexpected proof that, in the most important points of their anatomy, these ancient types actually equalled the Batrachian Reptiles in the complexity of their hearts, and of necessity ranked far higher than the bulk of our recent Fishes, in which the *bulbus arteriosus* is a mere thickening of the tunics of the artery—without muscular structure or pulsating power, and having the valves so placed that such power would be useless if it existed—leaving the heart with but one auricle and one ventricle."

No. IV.

On the supposed Interchange of Vegetable Species—Hybridization. Alternate Generations of Steenstrup. Parthenogenesis of Owen, &c.

(p. xliii.)

After the Author of the *Vestiges* had asserted, in edition after edition, that the *Cerealia* were all of one species, because they might be made, by artificial means, to interchange forms and pass one into another, the Edinburgh Reviewer replied—that this was an old story and probably not true, and that its truth or falsehood might readily be tested by experiment. I do not complain of this assertion respecting the transmutations of the *Cerealia;* but I do complain of the unqualified form in which it has been reproduced by an Author who is ready to snatch at any supposed fact that makes for his theory, without sifting, as he was bound to do, the evidence on which it ought to rest. Acting on a contrary principle, I first consulted Professor Lindley, who replied (in a letter I have before me) that he had not ascertained these vegetable transmutations—that he had not intended to lend his name to them—and that he had been improperly quoted. All he had said was this: "he thought such vegetable changes not impossible, and that they ought to be believed on good evidence." This differed not in substance from what was stated by the Reviewer. I then consulted Professor Henslow, who had so little faith in the asserted transmutations, that he thought the experiments hardly deserved a trial: and I afterwards obtained the opinion of Dr Hooker, who told me, without hesitation, that the asserted changes were not true—that they were most unphilosophical—and that the experiments *had been tried and had failed.* I finally consulted one, who, by almost common consent, is placed at the head of the botanists of Europe, and he gave the asserted interchanges of form among the Cereals what appeared to me an unqualified and contemptuous denial. And so I let this matter rest.

Within the last three years, several remarkable papers, on the Hybridization of Plants, have been published; among which I may mention two by the late Dean of Manchester. He followed up his experimental conclusions by some untried, and some persons may think rash, speculations on the extent to which the animal kingdom might, during past ages, have been modified by fruitful hybrids derived from animals of different species. The same subject has also been ably handled by Dr Morton of the United States.

I can, in this Note, barely allude to these subjects; but two remarks seem to be called for—1st, Hybridization can throw no light on spontaneous generation.—2ndly, It can throw no light on the theory of progressive development, unless it can be shewn, that some fruitful hybrid animals are higher on the organic scale than their parents. I believe, however, that hybrids are always of an intermediate type—and that, in case they continue fruitful, their progeny return, inevitably, to one of the parent types. Were it not so, and were fruitful hybrids so commonly produced, even among wild animals, as some have asserted, there could be no constancy in the forms of animated nature, and the animal kingdom could not now be the same it was before the days of Aristotle.

In the next paragraph, of the same page of the Preface (p. xliii), I have asserted "that *larvæ*, when they leave the ovum, have no sexual developement, and cannot, therefore, have the power of *generating* any new continued forms of animal being;" and in a previous page (p. xxxv) I have asserted that *larvæ*, such as the tadpole, "are immature, and without one exception are unfruitful." These remarks were meant to be applied more especially to the vertebrate divisions of the animal kingdom: but they may be extended much farther; for it is, I believe, literally true, that in no known part of the animal kingdom have male and female *larvæ* been ever seen with true sexual developement, and capable by their union of originating a cycle of fœtal changes, out of which shall be perfected either an old or new continued species of animal.

In another sense, however, it may be asserted, that in some of the lower families of the animal kingdom *larvæ* are incredibly fruitful, and for several successive generations (sometimes amounting to eight or ten) have an inherent power, without any new sexual union, of maturing, and bringing forth, new forms of larval life, till the specific organic cycle is complete: and then the two sexes are perfected, either in the same or in different individuals (as the case may be), by the union of which the same cycle may begin again, with similar successive changes of larval development. But in cases such as these there is no specific change in the perfect animals. They are of the same species with the parents from which they originally sprang. And though they may originate once again a most complicated series of organic changes, yet all such changes are governed by stern laws, whereby they are resolved into cycles, and in the end produce but another repetition of the old animal forms.

Facts of this kind have long been known and dwelt upon; but a new prominence was given to them by Professor Steenstrup, of Copenhagen, who marshalled them together, added to them by many original observations, and endeavoured to give them a symmetry and coherence by a new terminology based on the recorded facts. His views are given in detail in his work on *the Alternation of Generations*, translated and published by the Ray Society in 1845. The same subject was also, during the past year (1849), again taken up by Professor Owen, who endeavoured, in his work on *Parthenogenesis*, to explain physiologically the successive larval changes, and to establish what we may perhaps call a series of true connecting generative links between them. To these two works I must refer the reader for details which would be out of place here.

If animals, from the first appearance of their nascent germs to their full specific maturity, exhibit a cycle of organic changes, what is the beginning of the cycle? What are the conditions of generation? It is the union of a *spermatozoon* with the germinal vesicle of an *ovum*. And these two (the *spermatozoon* and the *ovum*) are the organic products of two perfect animals—male and female. These conditions being satisfied, there commences that cycle of changes, which, however complicated, are defined by the constant laws of nature, whereby two beings are again produced identical in species with the two beings from which the two fecundating elements, above-mentioned, were in the first instance derived.

The first set of changes is, in all animals, of the same kind; and consists in the formation of a vital germinal cell, and its propagation of a numerous offspring by repeated spontaneous divisions—an act defined sometimes by the terms "fissiparous generation." The whole congeries of germ-cells thus derived is called the "germ-mass." In the very lowest forms of animal life the process is here arrested; but if the germ-cells be derived from animals of a higher organic grade, other changes follow in regular order for each species. The derivative germ-cells now perform a part somewhat analogous to the atoms of the chemist, or the ultimate molecules of the mineralogist. They run together by what has been called organic affinity. "As individuals they may be said to die; but by their death they minister to the life of a being higher than themselves*." They combine to construct its organs, and to impart to it new properties: they thus begin, in subordination to law and in harmony with nature, a series of metamorphoses, that lead, step by step, to a preordained end—the perfection of an animal species, fitted mechanically to its own place in the organic world, and with vital instincts to put this mechanism in its proper movement.

But in using language like this let us not be led too far by mere analogies. The atoms of the chemist combine agreeably to simple numerical laws of affinity, and produce new compounds; and the molecules of the mineralogist in like manner combine and produce new crystalline forms: but these compounds and crystalline forms have no necessary connexion with any subsequent change; whereas the new organic forms in successive embryonic changes (by whatever powers produced) *have reference* to something which is to follow; they are a preparation for it; and in a certain sense they are the physical cause of it. These successive forms are not the simple result of affinities of dead matter, but are the result of vital affinities that have a prospective reference to some subsequent vital function. What is here intended is perhaps sufficiently explained in a previous discussion on Fœtal Development (*supra*, p. xxvii... p. xliv); and I must not dwell any longer on the subject here.

Among the higher vertebrate animals all the "derivative germ-cells" are employed in the formation of the fœtal tissues and organs, and all the fœtal changes up to the moment of full development are represented in one simple cycle. Not so, if we descend low on the organic scale. All the germ-cells are not employed in laying down the embryonic tissues. Part of them, with their full spermatic power, are entangled among the tissues, "and by virtue of their assimilative and fissiparous forces lay the foundation of a new organism[*]." In this way we not merely state a fact, but we give a physiological reason for it (compatibly with elementary vital laws), when we say that a new form of larval life may spring from a previous larva by Parthenogenesis—*i.e.* without sexual union: but at the same time by an organic process actually dependent on, and directly derived from, a true sexual union; out of which union sprang the first larval form in the complicated cycle of changes. Thus, a pair of Aphides may produce, compatibly with this view, a larval progeny that is fruitful without any new sexual union; and this may go on, time after time, till out of one union shall spring a progeny amounting to millions of millions. Still this cycle of transformed vitality has its termination; and it ends inevitably with *a brood of perfect animals*, male and female, of identical species with the two out of which the cycle was set in its complicated movement.

---

* Owen on *Parthenogenesis*, p. 5.

The larval changes above referred to throw no light on the theory of spontaneous generation; but leave it just where it was. Neither does the most complicated cycle of embryonic changes throw any light on the theory of development; unless we can show (which we cannot) that one cycle interferes with, or runs into, another. It matters not whether, in speaking of the marvellous transformations in the larval forms of any given species, we tell of *Parthenogenesis* with Owen, or of *Ammen* or *wet nurses* with Steenstrup. Each set of phenomena is in a true organic cycle, and the perfect animal with which the cycle ends is but a repetition of the same species with which the cycle started. To this rule there appears to be no exception; and the theory of transmutation, from one perfect species to another, derives no support from modern microscopic observations carried on with unwearied skill in illustrating the generative progress of the lowest animals on nature's scale.

---

[*] Owen on *Parthenogenesis*, p. 31.

It is not my object to confirm the views advanced here by quoting many instances that might seem in point; for in doing so, I should expand this Note beyond its proper limits. All I wish to do is to guide the reader, so far as I am able, to just conclusions, and to direct him to good sources of information. The whole subject is almost in its infancy; yet a marvellous series of facts has been established; and as some of them have been so interpreted as to give support to the theory of specific transmutations among the lowest creatures of animated nature, I am compelled just to allude to one or two of them, and to shew that they may be philosophically interpreted so as to point to a different conclusion.

A plant may spring from the germination of a fruitful seed, and the incipient process is in appearance identical with the first germination of an animal tissue from a fruitful ovum. But all the derivative germ-cells of the seed are not employed in laying down the organic tissues of the incipient plant; some of them pass onward unchanged through portions of the plant, and with continued powers of fissiparous multiplication; and they are thus so accumulated on certain portions of the organic tissue as to originate buds, out of which may spring a plant, of the same species, by gemmation. A long period of time, marked by many complicated organic changes, may elapse before the plant, either by natural or artificial means, can throw out that sexual blossom which completes the cycle of changes, by ending in a seed-vessel containing a fruitful seed like that out of which the vegetable species first began to germinate.

The lowest creatures in the animal kingdom propagate their kind by three different modes—by Ova—by Fission—and by Gemmation: and in these respects there are at least very close analogies between the propagation of certain plants and animals. Thus, "in the growth of the Conferva, which is analogous to that of Gemmation, each filament originates from a germ, which is first developed from a single cell; this cell increases, and it either divides, or its germ-granules give origin to two cells within it, which take the place of the former; and by a repetition of this increase and multiplication, a long and single series of tubular cells, attached at one end and free and constantly growing at the other, is at last produced."..."Except in the juxtaposition of the cells end on end, the process here described is the same as that with which the development *in ovo* of a Mammal, and doubtless also of Man himself, begins" (*Parthenogenesis*, p. 46). Again, "Dr Carpenter truly compares the fertilized ovum of the Medusa-parent to the *seed* of a plant; the Polype which grows from it (with its progeny by gemmation), to *leaf-buds*—and those discoid portions developed between the base and summit of the Strobila, to *flower-buds*. For these discoid segments, when separated, become either male or female Medusæ, and developing the generative organs justify the above comparison" (*Parthenogenesis*, p. 50). Lastly, "there is a close and beautiful analogy between the stages in the development of the Medusæ and those of the Tree—between the larva of the one and leaf of the other—between the ovum of the animal and the seed of the plant. Yet this comparison does not explain the essential condition of gemmation in either." (*Parthenogenesis*, p. 51).

But I must not dwell longer on the analogies presented by the growth of plants and animals. Coming back, therefore, to a well-known case of Gemmation in the Polype Hydra:—"the first step in the formation of a bud in the Hydra, is the multiplication of cells, which are aggregated together as in the ovum, and not set end on end as in the Conferva"..."The young Hydra from the bud is identical in organic structure and character with that which comes from the ovum; and when the effects of organic development are the same, their efficient causes cannot be *altogether distinct*."

..."The retention of the unused-up germ-cells in the tissues of the Hydra is the condition which explains the fact—that, when favourable external circumstances of light, heat, and food concur, it may be propagated by buds" (p. 47). ...Many derivative germ-cells and nuclei are retained in the body of the Hydra, each being, in its degree, impregnated; "and this (says Professor Owen) I continue to regard as the condition of its power of Gemmation; and also of the fact that, when cut into numerous parts, many Hydræ may be thus artificially propagated" (p. 48).

In all cases where propagation occurs by ova, the species possesses sexual organs; but among the lower animals these organs are sometimes very difficult to make manifest to the senses. When discovered by the help of microscopic examination, the female organ is recognized by the ova which it contains, consisting of the germinal vesicle and spot, and the yelk-cells—the male organs by their possessing cells from which proceed spermatozoa.

Infusory animalcula afford the simplest instance of Fission, which is their usual mode of propagation. They also propagate by germs; whether they propagate by *ova* is debated. The fact has not been observed, but is maintained, on philosophical grounds, by Ehrenberg, Owen, and others, and is denied by Siebold and Dujardin*.

It has been asserted, by some physiologists, that the generation of certain Entozoa is effected by the transformation of a pre-existing organized tissue into a new animal, and this might be called spontaneous generation. "But," replies Professor Owen (p. 31), "no one has ever seen a portion of a mucous membrane, muscular fibre, or other organized tissue detach and transform itself into an Entozoon. Such a process is as gratuitously assumed, and as little in accordance with observed phenomena, as *spontaneous generation* in the abstract."..... "The fissiparous nucleated cells of the ovum once transformed into tissue can produce nothing higher"..."but the cells which retain their primitive state amidst the various tissues of the new animal, may, by virtue of their assimilative and fissiparous forces, lay the foundation of a new organism*."

---

* See the second note to p. 65 of the *Parthenogenesis*. See also Owen's *Lectures on the Invertebrate Animals*, p. 85. (1843).

"In Polypes propagation occurs in all the three modes, but Fission is infrequent—Gemmation is a very ordinary mode; and probably all Polypes are also propagated by Ova. But all the individual Polypes on a Polype-stem, or Polypary, have not necessarily sexual organs. Some are without sex: and then there are produced on the stem, at certain seasons of the year, sexual individuals, which are of a very different form. In some species the sexual individuals, after budding from the stem, are detached in the form of bells or discs, even before the sexual organs are fully formed, and swim about freely *like Medusæ;* and have frequently been mistaken by naturalists for such, and have been recorded as new species.

"In very many Polypes a metamorphosis takes place during the development of the ovum: it probably occurs in all of them.

"The development of the fertilized ovum of a Polype proceeds by the usual continual division of the yelk-mass, whence arises a multitude of embryonal cells (called by Professor Owen germ-mass) enclosed in a ciliated covering. The embryo-Polype thus resembles an Infusory, rolling on its longer axis in the water by means of its vibratile cilia. After a time, it rests on some appropriate object; the cilia usually disappear, the body suffers dehiscence on the unattached surface, and allows the Polype, developed within, to send forth its arms. It multiplies by Gemmation, and so forms a new colony.

---

[*] The three following pages, containing examples in point, are extracted from an essay by Dr Clark, *On Larval Transformations of the lowest Animals*, in which he refers principally to the Comparative Anatomy of Professor Siebold of Frieburg.

"Generally speaking, Gemmation does not occur indifferently at any point of the body of a Polype, but in the same situations in the same species.

"Some may choose to assert that here we have a transformation of species: *e.g.* that, on *Campanularia geniculata*, Medusæ are first formed and then detached, and that these Medusæ by retrograde development produce ciliated Infusories.

"The true explanation is obvious: the Medusæ-shaped are the sexual individuals; and the ova of the female, in the earliest embryonal form of Infusories, swim about for the purpose of distributing the species. This embryonal form is little more than a bag of germ-cells. Of these cells a part is employed in the development of the Polype when fixed, and a part retained for the future development of the germs, which are non-sexual, and sexual, in their proper order and position on the stem."

"In many of the Parasitic Worms a still more complicated series of changes prevails in the development of the ovum. In no one species indeed has the whole series of these changes been connected by direct observation. But still enough has been done to establish the remarkable fact, that the embryo after leaving the egg, is not always changed into an individual resembling the parent; but into a new larval being, which produces broods of other larval forms. These last individuals undergo changes which close the series of metamorphoses; and in the end they become perfect animals like their parents.

"To instance in the Trematodes—(such creatures as the Liver Fluke.) In the ovum, after the germinal vesicle has disappeared, several large embryonal cells are observed within the yelk-mass—this last not having undergone the divisional process. It is the embryonal cells themselves which here undergo division and multiplication; the entire mass of them growing and multiplying at the expense of the yelk-mass, and at last occupying its place. The embryo is now composed of exceedingly minute germ-cells, enclosed in a ciliated epithelium, is of an oval form, and at one end has a suctorial disc. Succeeding stages in the Trematodes have been observed: especially two larval stages, of which one is cylindrical in form, the other caudate. The cylindrical larvæ are more or less perfectly organised; and in their interior new generations of larvæ are formed from original germ-cells, *not from ova*. This brood of new larvæ, again, may be either cylindrical, or caudate. But it is the caudate form which at length brings the series of metamorphoses to a close—by losing the tail and developing perfect sexual organs, and passing into the form of a complete Trematode.

"When the caudate larvæ have been so far developed as to burst the cylindrical body of the earlier larvæ which enclosed them, they swim about in search of a very different habitat from that of the parent. The Trematode was the parasite of a Mollusc: the caudate larva seeks about for the larva of some Insect. Siebold saw the *Cercaria armata*, the larva of a Trematode, readily penetrate the larvæ of *Ephemera* and other insects, which are developed in water, penetrating between the rings. Here it casts its tail, and surrounds itself with a covering, the secretion of its own body, in order to undergo its last change. But Siebold sees reason to doubt that this is completed within the body of the larval insect. Because, though he found numerous Trematode parasites in the bodies of the most different insects, whose larvæ live in water,—as of species of *Libellula*, *Ephemera*, *Phryganea*, &c.—yet he could never discover that their sexual organs were perfectly developed. He suspects that these organs, though they are visible in a rudimentary state in these parasites of insects, can only be developed in another locality; and that the animal obtains this development when it is swallowed, together with the insect it infests, by some bird or other animal.

"Here the original embryonal mass, beginning with the impregnated ovum, passes through a still more remarkable series of changes than those before considered. 1st, An infusorial form; 2nd, Cylindrical larvæ, worm-shaped, producing a brood from a portion of the unappropriated germ-cells; 3rd, Caudate larvæ, like *Cercaria*, the progeny of the former; 4th, Final change from the Cercarial form to that of the perfect creature with sexual organs." (*Dr Clark*).

In vertebrate animals, the whole spermatic force diffused among the germinal vesicles of the ovum is exhausted in the development of the tissues and organs of the individual. The cycle of fœtal changes is in each case simple, and but one form of larval life is produced. But it does sometimes happen, though very rarely, even in the human species, that a germ-cell has been carried forward, among the animal tissues, with sufficient powers of embryonic development to produce disease and death; but never with sufficient power to bring a fœtal form* to maturity.

The essence of the peculiarity in the embryonic development of the lower creatures of the animal kingdom is (on Owen's theory of *Parthenogenesis*) only this—All the germ-cells of the ovum are not at once appropriated to the formation of the embryo. A portion of such cells passes on, unchanged—from embryo to larva, and from one larval form to another—whilst other portions are changed at each stage of advance, and employed in laying down the organs belonging to that period of development: and in this way a complicated cycle is at length completed according to the law assigned to each Species.

"How the retained spermatic force (says Professor Owen) operates in the formation of a new germ-mass from secondary, ternary, or quaternary derivative germ-cells, I do not profess to explain" (p. 72). Neither is it known how the same force operates in the development of the primary germ-mass from the first vital germ of the ovum. We witness certain centres of attraction and repulsion, and we find a definite result. We know an anterior cause—the union of a *spermatozoon* and a germinal vesicle—out of which these attractions and repulsions began. In each species we know also the consequences that follow the first set of organic combinations. The sequence of the phenomena is in each case invariable, and we can therefore properly define it under the terms of an *empirical law*. But a wise physiologist presumes to go no farther.

---

* "I have myself (says Dr. Blundell) seen a fœtus, on the whole not imperfectly formed, about the size of six or seven months, and which was taken from the body of a boy where it lay in a sac, in communication with the child's duodenum, the boy being pregnant." (See *Lectures on the Principles and Practice of Midwifery*, by James Blundell, M. D., London, 1839. p. 481.)

The *spermatic force* seems to be soonest exhausted where the complexity and vital power of the perfect animal is greatest; and to be longest retained in cases where the structure and vital powers are of the lowest order. Thus this force is longest retained, and furthest transmitted, in the vegetable kingdom—the zoophytes manifest it in the next degree—and the power of the retained germ-cells to produce a perfect germ-mass and embryo, by the remnant of spermatic virtue they inherited, is finally lost, so far as is known, in the class of Insects, and in the lower Mollusca. In some creatures, however (such as Crabs and Lobsters, and certain Lizards), which can reproduce portions of their bodies that have been mutilated or broken off, we seem to trace the last fading energy of that transmitted force we have been here describing. In such creatures benevolent nature has deposited a store of unused derivative germ-cells on certain fixed points where they are most likely to be wanted; and it is from such fixed points, and from them alone, that the reproduction of a mutilated organ can begin.

No. V.

On the Development of the Animal and Vegetable Kingdoms in the oldest known Fossiliferous Strata.

(p. lxviii.)

THE best illustration of this point is found in Hall's *Palæontology of New York:* and I here place before the reader a synopsis of some of the facts brought to light by the American Geologists.

1. Potsdam Sandstone. The very lowest fossil-bearing deposit of North America.
    - Fucoids (one Genus).
    - Brachiopoda (*Lingula, Orbicula ?*)
2. Calciferous Sandstone.
    - Fucoids (Two Genera).
    - Crinoidea ? an obscure plate.
    - Brachiopoda (*Atrypa, Lingula*).
    - Gasteropoda (*Euomphalus, Maclurea, Ophileta, Turbo, Pleurotomaria*).
    - Cephalopoda (*Orthoceras*).
3. Chazy Limestone.
    - Zoophyta (Lam.) *Streptoplasma.*
    - Zoophyta (Polyzoa.) *Retepora,* genus resembling *Gorgonia, Stictopora, Chætetes.*
    - Echinodermata (*Actinocrinus, Asterias ?*)
    - Crustacea—*Illænus, Asaphus, Ceraurus.*
    - Brachiopoda (*Leptæna, Orthis, Atrypa, Orbicula*).
    - Gasteropoda (*Metoptoma, Maclurea, Scalites, Pleurotomaria, Capulus, Murchisonia, Raphistoma*).
    - Cephalopoda—*Bucania, Orthoceras.*
4. Bird's-eye Limestone.
    - Fucoids (One Genus.)
    - Crustacea—*Cytherina ?*
    - Lamellibranchiata—*Modiola ?*

Gasteropoda—*Murchisonia, Natica? Pleurotomaria.*
Cephalopoda—*Orthoceras.*

5. Black-river Limestone.
Zoophyta (Lam.) *Columnaria, Streptoplasma.*
Zoophyta (Polyzoa.) *Stromatocerium, Chætetes, Stictopora.*
Echinodermata (crinoidal Stems).
Cephalopoda—*Lituites, Gonioceras, Ormoceras, Endoceras, Orthoceras.*

Next follows the Trenton Limestone, containing all the well-known forms characterizing the rocks of Europe—from the Wenlock Shale downwards. But I think it unnecessary to quote the succeeding members of the American Palæozoic series.

I do not assert this very old series to be perfect. I only state that it is one of the very best and oldest with which we are acquainted. The oldest series in the British Isles is in general accordance with it. The same may be said of the corresponding series in Scandinavia and a part of Russia; and the naturalists who are now working out the organic sequence in Bohemia, so far as their results are published, seem to be gradually arriving at similar conclusions.

There is a vast Palæozoic region, extending from the Ural Mountains to the northern frontier of China, which may, perhaps, hereafter give us some fuller information on the oldest traces of animated nature. We have, on this subject, nothing to look for among the old, well-explored regions of France and Germany. South America gives us no assistance; and among the Isles of the Southern hemisphere, including New Holland, we have no known Palæozoic deposits that descend much below the Devonian system of Britain. Many geologists (and I profess myself to be one of their number) think that we have nearly reached the limit of the oldest fossil-bearing deposits. Sir Charles Lyell very properly warned geologists "against the hasty assumption that in any of these (Palæozoic) sections we have positively arrived at the lowest stratum containing organic remains in the crust of the earth." But what geologist ever asserted that he had seen in any of his sections the lowest of all fossil-bearing strata? The Author of the *Vestiges* did indeed assume that these old sections threw a clear light on the theory of development: but in making out his case he committed a series of blunders such as we shall look for in vain, within the compass of a few pages, in any other work on Natural History in the English tongue. Sir Charles Lyell's remark is no rebuke to the Edinburgh Reviewer; for the Edinburgh Reviewer started no theory. He simply combated a most unwarrantable abuse of theory: and this he did by an appeal to facts, which had been misquoted or unfairly interpreted by the Author of the *Vestiges*, in support of a theory. And what is the Author's reply in his published *Explanations* (p. 43)? "The *weakness* (of the Edinburgh Reviewer) consisted in looking only in one little portion of the earth, and believing it to be a criterion for all the rest. The writer seems yet to have to learn that knowledge is to be acquired by communication as well as by examination. Were a philosopher (supposing there could be such a being) to limit his view of mankind to juvenile schools, he might with equal rationality deny that there is any such thing in the world as an infant in the arms. 'We speak of what we have seen,' he might say, 'and finding no specimens of humanity under three feet high, we were weak enough to bow to nature, and believe that babes are a mere fancy'."

This is, no doubt, a pleasant way of diverting the reader's attention from the egregious blunders on points of fact, and very discreditable mis-statements, published in the first four editions of the *Vestiges*. But surely the Author was bound, before he dared to publish such a passage as I have quoted, to tell us (out of his profound "knowledge acquired by more ample communication") of some section or other where the historical development of organic life was in accordance with his own theory, and in plain antagonism with the facts quoted against him by the Edinburgh Reviewer. But he has done no such thing, and I defy him to do so now. Nature still refuses to speak the language of the *Vestiges;* and the Author's pleasantry only returns upon himself, and gives us a new illustration of a good old saying—*risu inepto res ineptior nulla est.*

As I am on the subject of the Author's pleasantry, I may quote another instance of it (*Explanations,* p. 87). "Of a somewhat different character are the Edinburgh Reviewer's remarks on the first relics of mammalia—the few bones of Cetacea from the Lower Oolite and of Marsupials from the Stonesfield-slate. Here the very first mammal family is undoubtedly marine; and, if it were to receive equal consideration with the grallatorial foot-prints, he ought certainly to admit that it favours the development theory. But he escapes from this claim by a mode of his own. He has not *seen* these relics! The American foot-prints were good evidence without being seen; but a fact which makes against his *theory* requires personal inspection, even though it may come forward with the authority of Baron Cuvier."

I have no doubt but several hundred readers of this extract have thought that for once, the Author of the *Vestiges* had his Reviewer on the hip. But what are the facts? *Some years before* the appearance of the first edition of the *Vestiges,* it had been satisfactorily proved, and was well known to all English Geologists, that the supposed Cetacean bones (in the Oxford Museum), found in the Great Oolite near Woodstock, were the bones of large Reptiles. Cuvier in a hasty view of these fossils naturally mistook their Class. He was an incomparable anatomist; but at the time of his visit, he knew little of fossil Reptiles, and he could not prophetically anticipate the great discoveries that would afterwards be brought to light by a study of the Oolitic genera.

What then does this last extract prove? It proves that the Author of the *Vestiges* (spite of his "knowledge acquired by communication as well as examination") started his theory before he had well studied the facts on which it must stand or fall:—It proves, moreover, how hard it is to argue with a dreamer whose knowledge is below the level of his own day. At any rate, his sneer against the Edinburgh Reviewer (who on this point was unquestionably right, while he was unquestionably wrong) returns with interest against himself.

To come back to Hall's list of Palæozoic fossils:—I have quoted the genera and not the species; and the six groups, taken collectively, give us one good specimen of the oldest known Palæozoic Fauna. The vegetable kingdom must, in some form or other, have preceded the animal; and as all the six groups are marine we have no right to expect in them any but marine-plants: but this by no means proves that, coeval with No. 1, there was no dry land, and that there were no contemporaneous forms of land-plants. The author of the *Vestiges* tells us of encrinital beds in No. 2, (*Explanations*, p. 40). Hall only describes one single and doubtful specimen of an encrinital plate: and we may remark, that in the lower part of these protozoic groups we do not meet with great beds and masses of petrified corals and encrinites, as we should certainly expect to do on the theory of development. The same remark applies to the lowest palæozoic strata in Britain and Scandinavia, and I believe also to the corresponding strata in Bohemia. In No. 3, Crustacea first appear; but they are preceded, in No. 2, by Cephalopoda, which are still higher on the scale. Considering the six formations as the deposits of a deep sea, there is no reason for considering their collective *fauna* "as a scanty and most defective development of life;" and assuredly the arrangement of the Genera and Orders suggests not the theory of development.

No. VI.

On osed derivation of the Terrestrial Flora from the ine, by a natural Transmutation of Species.

(p. lxxix.)

WHEN I wrote the paragraph to which the reference to (No. VI.) is appended, I was guided by phenomena repeatedly witnessed on f the great Bedford-Level; where we find marine productions encroaching one upon the other—s partly mingled together, —and sometimes distinct layers of deposit. I afterwards, thro s of Mr. H. Miller, became acquainted with *a Geologist*,—a work published in a series ons in *The Witness* newspaper during sever the years 1848 and 1849: and I intended, when the reference to (No. VI.) was printed, to end this Note with a long extract from one of Mr. Miller's chapters, where he has ably criticised the asserted transmutations, from marine to terrestrial species, by an appeal to facts observed on the coast of Scotland. As, however, he has now recorded his matured opinions in his *Footprints of the Creator*, I suppress my intended extract from *The Rambles*, and am happy to refer the reader to the Chapters of the *Footprints*, commencing at p. 181, and more especially to the Chapter commencing p. 238.

No. VII.

On the Use and the Abuse of the word Law; and on the methods by which we rise to a right conception of it among physical phenomena; Kepler's Laws; Bode's Laws; Kirkwood's Laws; &c.

(p. cl.)

I HAVE made repeated allusions to the loose manner in which some writers make use of the word *Law;* thereby throwing doubt and confusion on the nature of inductive evidence, and showing their very feeble conception of the severity, and I might almost say the sanctity, of philosophic truth. Our first conception of a physical law is suggested by some observed, and regularly recurring, sequence of phenomena. We are naturally led to a belief that such a sequence must originate in some invariable cause; and we thus bring the phenomena under a conception implied by the word *law*. Such a *law* is at first purely empirical; but it may at length rise to a very high degree of certainty by further evidence, and by the application of one of Newton's rules, viz. that effects of the same kind must be derived from the same causes. On the other hand, our supposed empirical law may be upset by the evidence of new experiments, and therefore cease altogether to be regarded as a natural law.

Again, we can in some instances not merely comprehend the law of phenomena, but we can rise by demonstrative evidence to the conception of a higher law of nature that gives us the true physical cause of the phenomena. We can then derive, by a reversed process, the phenomena from the physical cause, and establish them, not as empirical, but as necessary truths; and we can thereby bring also a multitude of new phenomena under our conception of necessary truths (*infra*, note A. p. 99.) But we must ever bear in mind that the truth of a *physical law* —using that word in its highest sense —depends upon the demonstrative severity of our induction; and that its deductive application, as a *vera causa* in the explanation of phenomena, can only be justified in those cases where the results demonstratively derived from it are in *exact* agreement with the observed facts of nature. The moment we deal in hypothetical causes, and in results drawn from them, which are but in a loose and approximate agreement with phenomena, we desert all our higher conceptions of *law*: and while we use the term, in a new and degraded meaning, we may be sanctioning some of those phantastical speculations which have distorted and hindered the onward movements of true science. I here subjoin a few examples both of the use and the abuse of the word *Law*.

(1) It appears to be a *law* of nature, that, in each species, individual organic life begins by the reception of a *spermatozoon* within the germ-cell of an *ovum*. This is one of the best established inductive truths within the range of natural science. For it is based on consistent observations carried almost through all animated nature; with the exception of the very humblest forms of animal life, among which optical instruments of the highest power sometimes fail to give such definite results—fairly appreciable by the senses—as would at once confirm the law. We are surely justified in extending one of Newton's rules to such cases, and assuming that like effects must be due to like causes*.

(2) Another law of organic nature tells us, that in each species (and species are now only to be counted by tens of thousands), life, after it has commenced, is carried on by a cycle of definite changes, far more complicated in the lower animals than in the higher, but in all animals ending with *a species* identical with that from which came the first vital germ wherewith the cycle began. In the two preceding instances, the word *law* is not used in its highest sense; for the law is in both cases empirical. We are not now, and we probably never shall be, able to grasp the conception of any higher organic law out of which we could deductively evolve the multitudinous organic cycles exhibited in animated nature. The definite conception of such a law seems utterly beyond the reach of human thought.

(3) When we tell of the union of dead gelatinous matter with the galvanic fluid as the beginning of organic life, and call this a *law* of nature, we violate the integrity of language. We are not describing a *law* made out inductively; but we are starting an *hypothesis*.

---

* See an elaborate and cautiously written note on this question by Professor Owen. *Parthenogenesis*, p. 65.

(4) In like manner we violate the proper application of the word *law* when we affirm the truth of specific transmutations and progressive development, and describe such transmutations as a part of nature's laws. We merely start an hypothesis, which cannot pass even into an empirical law without its proper inductive proof. We need not go far to find men who talk of bringing all nature in subordination to physical law, while they have no real grasp of the meaning of the word *law*, and are doing their best to destroy, root and branch, every principle of scientific study, out of which all our true conceptions of law and order have been established.

(5) But there are innumerable traces of organic life in the old world, which belong not to any of the cycles of organic changes we now see before us. How did they begin? By physical law? Physical law, we reply, has nothing to do with the beginning and ordaining of law: it has only to do with the orderly succession of phenomena, or with known causes out of which the succession necessarily springs. Still more should we be guilty of flagrant fraud, by talking of a *law* of development whereby one Order might pass into another, and a Monad might gradually mount into a Man. Our law is worthless so long as it rests not on inductive evidence; or, at the very least, unless it be suggested by the accepted analogies of living nature.

(6) We do, however, see in nature, animate and inanimate, proofs of design and prescient wisdom; and the same constitution of the mind that led us to the conception of organic and physical laws, leads us also to a conception of a great First Cause—a personal power and will above all nature. When we speak of the beginning of a law, we pass beyond the domain of physical science: we can then only tell of the great First Cause, and of the effects of His creative power. At this point material and moral truths become united. The God of nature has joined them together, and it is not in the power of man to put them asunder.

So far my illustrations, both of the use and abuse of the word law, are drawn from organic nature. The following instances are of a different kind. Among inorganic material phenomena we constantly find the word law applied in three different senses. (1) A material law may be a demonstrative consequence of an accepted law about which no one doubts; in which case it is a representative of the very highest form of material truth, and admits not of degrees. (2) It may be empirical—a mere law of observation—in which case (unlike the former conception of law) it admits of degrees: but in its best form it irresistibly compels our belief. (3) It may be hypothetical: but to be a good hypothetical law, it ought to be suggested by the accepted facts of nature, and tested by them; so that it may pass into the form of an empirical law, or be rejected altogether.

(7) Kepler's three laws were empirical. The first two were laws derived from a limited series of observations; and, at the time of their discovery, he could not prove that they were necessary truths involved in any higher principle. The third law was deduced arithmetically from the distances of the Planets—as determined by Kepler—and their known periodic times. The squares of the periodic times of the Planets were found to be in a constant ratio to the cubes of their several mean distances from the Sun. These ratios were *exact*, and not merely *approximate:* and hence, by a good generalization, they led to the establishment of a good empirical law. Astronomical observations, carried on for more than two thousand years, gradually supplied a knowledge of facts out of which Kepler at length evolved his three empirical laws. A cultivation of mathematical and mechanical science for as long a period of time, (however interrupted or sometimes misdirected) gave mankind a stock of accumulated knowledge out of which Newton fabricated implements of sufficient strength to bring the phe-mena of the solar system under obedience to law and Pe. And in his hands Kepler's laws ceased to be empiri-

cal laws, and passed into the highest grade of deductive laws. They became necessary truths involved in the very highest and most exact conception of a physical truth that man has ever reached.

(8) Bode's law of the planetary distances was only hypothetical. It was a mere algebraical artifice which represented approximately, but not accurately, the distances of certain Planets from the Sun. In some points it failed; and it fails absolutely in its application to the distance of the new planet Neptune; so that it now breaks down even as an hypothetical law: but as it illustrates the meaning of this Note, I will dwell on it a little longer.

We cannot look at a pictorial representation of the planetary system without seeing that the superior Planets are much farther apart than the inferior: and the same remark applies also to the Satellites of the Planets where they are sufficiently numerous to offer us any suggestion of a definite law of arrangement. It was first remarked that, by interpolating hypothetically a Planet between Mars and Jupiter, we might suppose the intervals between the orbits to go on by continued reduplication. Thus the distance from the Earth to Mars would only be about half the distance from Mars to the hypothetical Planet: and in like manner the distance from the hypothetical Planet to Jupiter would only be half the distance from Jupiter to Saturn, and lastly, the distance from Jupiter to Saturn would only be half the distance from Saturn to Uranus. This hypothetical law is not mathematically true in any single step; and it fails absolutely in defining the intervals between the three inferior Planets.

Another arithmetical artifice was therefore invented. Call the distance of Mercury from the Sun $= a$, and the distance from Mercury to Venus $= b$. Then the whole series of the planetary distances from the Sun may be represented by the following numbers:

$$a;\ a+b;\ a+2b;\ a+4b;\ a+8b;\ a+16b;\ a+32b;\ a+64b;\ a+128b.$$

These numbers ought to represent in order all the mean planetary distances: but they represent none of the distances correctly except the first two, which are not determined artificially, but are assumed from nature as the basis of the series. And the last term ($a + 128b$) does not, even approximately, represent the distance of Neptune; for it is too great by more than one-fifth. This fact was not, however, known to Bode.

Here then we have a good instance of the difference between an empirical and a hypothetical law. Kepler assumed not the existence of any particular law; but sought for some analogy among the Planets between their distances and times of revolution, and at length he hit upon an analogy which was mathematically true. His facts therefore passed first into the condition of a good empirical law; and afterwards, in Newton's hands, rose to the rank of necessary truths involved in a higher conception of law. Bode's law was a hypothetical artifice to represent algebraically a series of known planetary distances. His series was wanting in simplicity, was not suggested by any known physical cause, never represented with perfect accuracy any of the distances, and has now ceased altogether to be regarded as the representative of a law.

The history of this hypothetical law is in other respects instructive. The fifth term of the series (*i. e.* $a + 8b$) represented the place of the hypothetical Planet; and two small Planets were afterwards discovered revolving very nearly at this theoretical distance. This was, at first, a great triumph to the inventor of the hypothesis: but other small Planets were afterwards discovered, and it was conjectured that they might have been dissipated by the explosion of a Planet, of which they were only the fragments. An hypothesis that requires another hypothesis to support it is always in peril of falling to the ground. All the small Planets, or Asteroïds, between Mars and Jupiter (and we now know eleven of them) have not one common point of intersection. The orbits of Flora and Ceres are in a position which seems fatal to the explosion-theory. The mean distance of Ceres from the Sun is nearly the same as that of Pallas; but there is no risk of collision, as they have different eccentricities and different inclinations to the *invariable plane.* The distance of Flora is 2.2—that of Pallas is 2.8—calling (1) the mean distance of the Earth. It follows, therefore, that the interval between the orbits of Flora and Pallas (taken at their mean distances) is equal to six-tenths of the Earth's distance from the Sun. This fact seems perfectly destructive of Bode's law. The most remarkable fact, however, in the history of Bode's law is this. It was assumed as a basis of the reasoning by which Adams and Le Verrier attempted to determine the place of an unknown Planet exterior to Uranus. They found, however, that the assumed distance was too great to give by calculation the results they were seeking after. The hypothetical distance was corrected, and after almost incredible labour, aided by the powers of high analysis, the place of Neptune was at length so nearly determined, that a good observer, possessed of the German sidereal maps, might have discovered it by the help of an astronomical telescope in a few hours. Thus, by a fate not unexampled in the history of science, though Bode's hypothetical law led the way to a great discovery; yet that discovery destroyed the law, and removed it from the list of empirical scientific truths.

May not the Asteroïds, it has been asked, between Mars and Jupiter, be the ultimate results of one or more nebulous rings, that were thrown off and broken up into several fragments during their progress of condensation? This is far more plausible than the hypothesis of an explosion: but it offers no explanation whatsoever of the great inclination of some of their orbits to the *invariable plane*, or of the very variable eccentricities of their orbits; and it cannot therefore be received even as a good hypothetical explanation of the phenomena presented by the eleven small Planets.

(9) I may here mention another supposed empirical law of the planetary system, published last year by Mr. Kirkwood, of the United States, at the meeting of the American Association for the Advancement of Science. Of the Author's Memoir I have no knowledge but what is derived from the reports of some scientific journals; but I trust that the following short statement will correctly represent his general views.

Let us suppose all the Planets to be arranged on one straight line at their respective mean distances from the Sun; and let us further suppose all the (eleven) small Planets between Mars and Jupiter to be condensed into one, and placed at the mean of all their mean distances. We shall thus (beginning with Mercury) have nine Planets arranged in order upon one straight line. Between each of the Planets determine the neutral point: *i.e.* the point where a particle of matter would be equally attracted by the next inferior and next superior Planet. In this way we shall have eight successive neutral points. Next describe a circle upon a diameter representing the distance from the first to the second neutral point—the first point of course falling between Mercury and Venus, and the second between Venus and the Earth. Again, describe a second circle upon a diameter representing the distance between the second and third neutral point, and so on through the system. In this way we shall have seven successive circles inclosing seven successive Planets, beginning with Venus and ending with Uranus. Now the supposed empirical law is this:—*The square of the time of each Planet's revolution about its axis varies as the cube of the diameter of the circle thus inclosing it.* Were this law mathematically true, it would be a very valuable addition to our knowledge, though the law would still be purely empirical, inasmuch as it is neither derived from, nor suggested by, any known law of the Solar System. And we may further remark the utter want of simplicity in its first conception; wherein it entirely differs from Kepler's third law, which only asserted (at first empirically) a fixed numerical proportion between a Planet's distance from, and its time of revolution about, the Sun. Spite of all objections the new law must be accepted with all its consequences, if it be proved true. Has it then been proved? Unquestionably not: and (unless Mr. Kirkwood's views have been misrepresented in the journals) it seems impossible, in the present condition of our information, to prove the asserted law. We cannot determine correctly the diameter of the first circle, because the mass of Mercury is not yet determined with certainty. In the case of the second circle inclosing the earth there is no ambiguity, and we can determine the analogy required for the test of the supposed law, very correctly. But in the case of Mars, how are we to describe the required circle? One end of its diameter (between Mars and the Earth) is known—the other end can only be determined hypothetically. As for the eleven small Planets, the law is entirely inapplicable to them without a complication of gratuitous hypotheses. In the case of Jupiter, as in the case of Mars, the law wants direct evidence, for we can only determine the diameter of the required circle hypothetically. Saturn we can bring to the test; and it is said that in this case the proportion, between the square of the time of the Planet's rotation and the cube of the diameter of the circle inclosing it, is nearly the same as in the previous case of the Earth. Supposing these analogies mathematically true, they would not prove the empirical law for the five other cases.

If these views be correct, Mr. Kirkwood's analogies have by no means risen to the rank of an empirical law. They are but illustrations of a hypothetical, and many will think a very improbable, law of the Planetary System.

It would be very wrong to find fault with any honest efforts to trace new analogies in our System by tentative methods like those used by Kepler: but we are, I think, justified in asserting that such attempts will generally prove but labour lost. Since the days of Newton no great discov ar System have been made in this manner: on the they have been evolved by deductive reasoning fro nechanical laws that govern the movements of the worlc been the results of direct astronomical observation.

I have been led into the previous details of this Note by the very common use and abuse of the word 'Law' when applied to phenomena that are physical. The abuse of the word is, perhaps, still m on when applied to numerical results derived fi s implying the doctrines of chance, and especially ts implying the operation of social or moral caus these subjects I may not dwell. Numerical d from the operation of irregular or intermitt e of great value; but we mistake their mean pply them unconditionally as we do a known hemical law.

No. VIII.

A series of extracts from Oken's "Physiophilosophy."

(p. cciv.)

INTRODUCTION.

"Physio-philosophy has to show how, and in accordance indeed with what laws, the Material took its origin; and, therefore, how something derived its existence from nothing. It has to portray the first periods of the world's development from nothing; how the elements and heavenly bodies originated; in what method by self-evolution into higher and manifold forms, they separated into minerals, became finally organic, and in Man attained self-consciousness." . . .

. . . "Man is the summit, the crown of nature's development, and must comprehend everything that has preceded him, even as the fruit includes within itself all the earlier developed parts of the plant. In a word, Man must represent the whole world in miniature."

Truth.

"If anything be certain it can only be *one* in number. If, then, there be only *one* certainty, there can also be only *one* science, from which all the rest must be derived."...

"The Mathematical is certain, and, by virtue of this character, it stands also alone.... The fundamental propositions of mathematics must, therefore, be fundamental propositions for all other sciences also."

Part I.—MATHESIS, OF THE WHOLE.

Nothing.

"The highest mathematical idea, or the fundamental principle of all mathematics is the zero = 0."...

"Zero is in itself nothing. Mathematics is based upon nothing, and, consequently, arises out of nothing."...

"Real and Ideal are no more different from each other than ice and water; both of these, as is well known, are essentially one and the same, and yet are different, the diversity consisting only in the form. ... Everything which appears to be essentially different from another, is so only in the form."...

"The Real and Ideal are one and the same, only under two kinds of form."

Essence of Nothing.

"The Eternal is the *nothing* of Nature."...

"As the whole of mathematics emerges out of zero, so must everything which is a Singular have emerged from the Eternal or nothing of Nature."

Something.

"There is no other science than that which treats of Nothing."...

"Every Real, if it were such in itself, could not be known, because the possibilities of its properties would pass into the Infinite. The Nothing alone is cognizable, because it has only a single property, namely, that of having none; concerning which knowledge no doubt can be entertained."

PNEUMATOGENY—PRIMARY ACT.

"With zero the Eternal originates directly, or both are only different expressions for one and the same act, according with the difference of the science wherein they are employed. Mathematics designates its primary act by the name of zero; Philosophy by that of Eternal. It is an error to believe that numbers were absolute nothings; they are acts and consequently realities. While numbers in a mathematical sense are positions and negations of Nothing, in the philosophical they are positions and negations of the Eternal. Everything which is real, posited, finite, has become this out of numbers; or, more strictly speaking, *every Real is absolutely nothing else than a number.*" . . .

"*There exists nothing but Nothing, nothing but the Eternal*, and all individual existence is only a fallacious existence. All individual things are monades, nothings, which have, however, become determined."

GOD—FORM OF GOD—TRINITY.

From the pages under these heads I venture to make no extracts. I wish not to misrepresent them; but they appear to me a strange, inexplicable compound of Atheism, Pantheism, and Mysticism.

POLARITY.

"Every single thing is a duplicity." . . .

"The law of causality is a law of polarity. Causality is valid only in time, is only a series of numbers. Time itself has no causality. Causality is an act of generation. The sex is rooted in the first movement of the world."

MOTION.

"The primary motion is only possible in a circle, because it fills everything." . . .

"The motion of finite things by polarity may, in a wider sense, be called life; for life is motion in the circle. Polarity, however, is a constant retrogression into itself. Without life there is no being. Nothing is, simply by virtue of being, *e.g.* by its mere presence; but everything of which a being can be declared, is only, or manifests itself, by its polar motion or by life. Being and life are inseparable ideas." ....

"Everything in the world is endowed with life; the world itself is alive, and continues only, maintains itself, by virtue of its life; just as an organic body maintains itself, only while it is constantly being generated anew by the vital process."

MAN.

"Man is God wholly manifested. God has become Man, zero has become + –. Man is the whole of arithmetic, compacted, however, out of all numbers; he can therefore produce numbers out of himself. Man is a complex of all that surrounds him, namely, of element, mineral, plant and animal." .... .

"Animals are men, who never imagine. They are imaginative, but never of themselves wholly; they are therefore beings who never attain to consciousness concerning themselves. They are single accounts; Man is the whole of mathematics." ....

"Arithmetic is the truly absolute or divine science, and therefore everything in it is also directly certain, because everything in it resembles the Divine. Theology is arithmetic personified." ....

"A natural thing is nothing but a self-moving number."

SPACE.

"Time remaining stationary is *Space*. Space is not different in essence from time, but only according to position; it is only time resting, while this is moved, active space."

"Space is everywhere, as time is ever. Two spaces can no more exist than two times."....

"There is no void or empty space, no time and no place, where a Finite could not be; for time and space are virtually the manifesting primary act, the zero that has become thing."

POINT.

"For God to become real, he must appear under the form of the sphere. There is no other form for God. God manifesting is an infinite sphere.

"The sphere is, therefore, the most perfect form; for it is the primary, the divine form. Angular forms are imperfect. The more spherical a thing is in form, by so much the more perfect and divine is it. The Inorganic is angular, the Organic spherical.

"The universe is a globe, and everything, which is a Total in the universe, is a globe."

ROTATION.

"The primary sphere is rotating, for it has originated through motion; the motion of the sphere cannot, however, be progressive, for it fills everything. God is a rotating globe. The *world is God rotating*. All motion is circular, and there is everywhere no straight motion any more than there is a single line or straight surface. Everything is comprehended in ceaseless rotation. *Without rotation there is no being and no life*; for without it, there is no sphere, no space and no time."

GRAVITY.

"The globe only exists in an uneasy state, because it has no place in the centre.

"Every finite thing strives towards the centre."....

"This exertion or endeavour, by virtue of which things would be in the centre, is *Gravity*."....

"The sphere is only produced by *action*. This action must therefore manifest itself in two ways, as centrifugality and centripetality. The first is the dispersion of the primary act or of points, the second is the collection of the primary acts or points into the unity, and this is gravity. Centrifugality originates only in a constrained manner or with reluctance, for the primary act always seeks the centre, and only moves towards the periphery, because it has no longer any place there. If centripetality be regarded as a force, then is *centrifugality no force,* but only centripetality itself retreating from the centre; even as cold and darkness are probably no particular forces in themselves, but only weaker degrees of heat or light." . . .

"The world itself has no weight, or else it must be heavy in relation to something else without it. The ideas of gravity and weight, as we speak of them in reference to individual things, are not applicable to the world, still less to God." . . .

"As the sphere has originated out of nothing, so also has gravity originated out of the same. The form is a formed nothing: the form is, however, no form without internal forming force, and to this gravity belongs. The being of form and the being of gravity are one. Gravity is a weighty nothing, a heavy essence, striving towards centre, a realization of the first divine idea. Gravity cannot, therefore, be perceived in the universe as a whole, but only in its parts."

MATTER.

" The whole universe is material, is nothing but matter; for it is the primary act eternally repeating itself in the centre. *The universe is a rotating globe of matter."* . . .

"There is no activity without matter, but also no matter without activity, both being one; for gravity is itself the activity, and itself the matter....There is no dead matter; it is alive through its being, through the Eternal that is in it Matter has no existence in itself, but it is the Eternal only that exists in it. Everything is God, that is there, and without God there is absolutely nothing." . . .

"Nothing exists if it is not material. Matter is accordingly coexistent with the presence of God." . . .

"The Immaterial does not exist; for even the Material which is *not*, is the Immaterial. Everything that is, is material. Now, however, there is nothing that is not; consequently, there is everywhere nothing immaterial."

ÆTHER.

"The matter, which is the direct position of God, which fills the whole universe, which is the time in a state of tension and motion, the formed space, the heavy primary essence, I call the *Primary matter*, the matter of the world, cosmic matter, *Æther*. The æther is the first realization of God, the eternal position of the same. It is the first matter of creation. Everything has consequently originated out of it. It is the highest, divine element, the divine body, the primary substance = 0 + –." . . .

"The æther fills out the whole universe, and is, consequently a sphere, yea, the world's sphere itself; the world is a rotating globe of æther."

HEAVENLY BODY.

"A sphere rotating for itself is called *a Heavenly body:* A heavenly body again is the image or metatype of the Eternal; it is a whole, it is alive; everything, even the highest, can originate out of it; everything develop itself out of the coagulated, individualized æther. The heavenly body has a double life, an individual and an universal, since it is for itself and at the same time in the general centre. Every *Individual* must have a double life." . . .

"The heavenly bodies are as old as the æther, consequently they are from the beginning, and endure also without end. As they are only coagulated æther, so are they susceptible of being resolved into the same, such as are probably the comets."

LIGHT.

"Light is from eternity, for the tense æther was from eternity. The dark chaos exists only as inventive. Light is time that has become real, the first manifestation of God; is God himself positing, is the dyadic God." . . .

"The whole universe is transparent, because everything has issued out of the tension of æther. Everything which is matter is light, and without light there is nothing. Without light the universe is not only dark, but it is even not. Light is the universe, and every Finite is only a different position of light. The world is a thoroughly illuminating globe, a rotating globe of light. The solar system must have been created according to the laws of light. The phenomena of the world are only representations of optics, consequently of living geometry. What we see is nothing but optical construction or figuration."

FIRE.

"Light and heat were the first phenomena of the world. Heat with light, however, are *Fire*. Fire is the totality of æther, is God manifested in his totality. God, previous to his determination to create a world, was darkness; in the first act of creation, however, he appeared as fire. There is no higher, more perfect symbol of divinity than fire. God's whole consciousness, apart from individual thoughts, is fire. The Holy Scriptures therefore usually admit of God appearing under the form of a fire, as a fiery bush, a flame. The world is none other than a rotating globe of fire." . . .

"Everything that is, has originated out of fire; everything is only *cooled*, rigidified fire. As everything has become out of fire, so must everything to be annihilated have recourse to fire. If finite things be only fire singly posited, so must every change occurring in the same be an igneous change. Nothing changes in the world but fire. The essential change of things take place only by fire."

RETROSPECT.

"The triplicity of the primary act in the universe has now been completely demonstrated. The first manifestation of God is monas; to this corresponds *Gravity, Æther,* darkness, the cold of chaos. The second manifestation of God is the dyas; to this corresponds the æther in a state of tension, the *Light.* The third manifestation of God is the trias; to this corresponds the want of form, *Heat. God being in himself is Gravity; acting,* self-emergent, *Light; both together,* or returning into himself, *Heat.* These are the *three Primals* in the world, and equal to the three which were prior to the world. They are the manifested triunity = *Fire.*"

I give not these extracts merely to throw ridicule on Oken's system—I disclaim any such intention; but I lay them before the Cambridge student that he may see the depths of mysticism, pantheistic profanity, and arrant nonsense, into which a very clever, inventive, and well-informed physiologist may sink, when he deserts the track so nobly delineated by Bacon, and so gloriously trodden by men like Galileo, Newton, La Place, and Cuvier. By casting away the lessons of inductive truth from the ample stores of his mind, and taking on himself to spin a web of creation out of his own brain, by *à priori* reasoning, he has not illustrated the ways of truth—he has not honoured nature, but most shamefully disfigured and distorted her. He has suicidally shorn himself of his strength, and thereby cut himself off from the only means of ascending to the higher truths of nature; and he has done his best to sink himself (and it was no easy task) to the level of a fantastical dreamer, a profane mystic, and a babbler.

PART II.—COSMOGENY.

"Through light duplicity originates in the æther, by virtue of which the æther divides into central and peripheric æther. The peripheric necessarily rotates around the central. Every part of the æther is a sphere; the æther therefore is separated by the light into infinitely numerous central and peripheric spheres....Creation is an endless position of centres."...

"The central spheres are characterized by absoluteness, the peripheric, however, by finiteness, division; the former are something in themselves, but the latter are so only by opposition; yet the two could not be without each other."...

"Chaos is not conceivable, without being at the same time solar system. The solar systems are nothing specially created, but have been given with chaos or with light, are indeed only the æther separated by light."

MOTION.

"The planets are originally concentric *hollow globes*, in the midst of which the sun is formed. There are several hollow globes, because the light has several points of contraction at certain distances from the sun."...

"These hollow planetary globes, on account of the rarity of their mass, their rotation, and the greater tension of light, could not subsist in the equatorial plane of the solar system, but coagulate together in equatorial rings about the centre of the whole system. The planetary fœtuses are only *solar rings*, which rotate with the sun."...

"This is the genesis of the planetary system, but everything has become, and remained as it became, at one stroke."

FORM.

"As the real universe can only exist in a bicentral condition, so is there in this respect also no universal central body. It is there, but under the form of bicentrality, as sun and planet. God only is monocentral. The world is the bicentral God, God the monocentral world, which is the same with monas and dyas....Self-consciousness is a living ellipse."...

"Were the mass of the sun less, all the planets would range nearer to it; were it greater, they would be all driven further off, as electricity repels the pith-balls of elder-wood."...

"The circumvolution of the planets around the sun is a *polar* process of *attraction* and *repulsion*, by virtue of the primary law in the solar system, by virtue of the light. The planet then can only be repelled in the neighbourhood of the sun from the sun, when it has the *same* solar pole in itself, when it has become positive; and can only attract it at a distance from the sun, when it has received the opposite pole to the sun, or has become negative."...

"The planet discharges its pole in the neighbourhood of the sun, like a cork pellet, and reloads of itself at a distance from the sun; and thus oscillates to and fro, like the hammer in an electrical bell. The course of the planets takes place with the greatest ease. It is everywhere no force of weight, of impulse, but of the easiest self-motion. The planet revolves by its own force to and from the sun like the blood circulates to and from the heart."...

"Although the planets have a centrifugal tendency, they are not thrown by a prodigious mechanical force in the direction of the tangent, and then drawn back by an attractive force of the sun, that has no import or meaning; but they course in a playful manner round the sun. A theory of attraction of this kind has no physical sense."...

"Were the planet dead, it could not be attracted or repelled by the sun; it would have from the very beginning always maintained a similar pole in itself, and it could therefore only move in a circular manner around the sun."...

"The more living a planet is, by so much the more excentric is its path, because it enters into great opposition with the light."

COMETS.

"The comets are heavenly bodies, devoid of a persistent grade of polarity, and without any substantial change in the same. They obtain their polarity solely from the sun, like the cork pellet from the electrical machine. The comet is therefore repelled as far from the sun as there is still an action between it and the polarity that has been imparted to the comet.

"At the point where all antagonism between comet and sun ceases, the former must remain stationary, and resolve itself again into æther. This is the case with those comets that never return. These comets are temporal coagulations of æther by light, and thus continued creation."...

"The tail follows the comet not really but only ideally. ...The tail is only an optical spectrum."...

"Returning comets are probably polarized by two suns."

What will our sober Newtonians say to the last two pages? We sometimes talk of circumjovial stars, but our scheme is all asleep. Hegel tells us that the Planets move through the sky like "blessed Gods"—Oken, that "they course in a playful manner round the Sun;" and that the theory of attraction is all a sham—"a *qualitas occulta*—an angel which flies before the Planets." The tail of a Comet was, however, a splendid puzzle to astronomers; and Oken has hit it off well when he turns it into an ideality—an optical spectrum.

CONDENSATION—ELEMENTS—AIR—WATER—EARTH.

Under these heads I make no extracts. But in Oken's hand they have a moral, as the following words will prove:

"In the creation the three primary ideas attained only by degrees to reality. First of all the trias becomes real in the air, then the dyas in water, and lastly the monas in the earth. The creation of the elements is none other than a representation of the three divine ideas in a finite sphere. Creation is a process of formation of the nothing."...

"God is a threefold Trinity; at first the Eternal, then the Ætherial, and finally the Terrestrial, where it is completely divided.

"The holy primary number is 3; the second is 9. The æther is 1 in 3; the other elements are simply the 3 of the æther, together 4. 2 × 3, however, or 6, lies at the bottom of this 4. The symbolic numbers are consequently 1, 3, 4, 6, 9, which fundamentally are one and the same, but in different combinations. With this, however, all formation does not yet terminate; to the four elements is added the vegetable and animal kingdom. The number of the days of creation is 6."

Functions of the Elements:—GRAVITY—LIGHT—INFLEXION —REFRACTION—REFLEXION—COLOURS.

These several heads I must almost pass over: but I may tell our optical students:—"that matter is only condensed æther"—"that it is the activity of light by which the æther hardens into matter"—"that oxygen is the corporeal light" —"that light is the tension of oxygen; and when this reaches its maximum, light issues forth"—"that the Sun is the body of oxygen, the water of the world—space,—and that the Sun is four times less dense than the Earth; it is thus pretty nearly in the condition of water."—I request him, also, to read (in order that he may apprehend the transcendental flights of high philosophy, and the folly of grovelling after Newton) the whole section on COLOURS. I will, however, quote the moral meaning of the whole.

"The symbolical doctrine of the colours is correct according to the philosophy of nature. *Red* is fire, love—Father. *Blue* is air, truth and belief—Son. *Green* is water, formation, hope—Ghost. These are the three cardinal virtues. Yellow is earth, the Immoveable, Inexorable, falsity the only vice—Satan. There are three virtues, but only one vice. A result obtained by Physio-philosophy, whereof Pneumato-philosophy as yet augurs nothing."

When the student has read this precious extract of Physio-Philosophy, he may digest with advantage and amazement the chromatic grouping of the Planets, which is too long to be given here.

CRYSTALLIZATION and MINERALOGY, I must pass over. I mean not to affirm that there are no good ideas in this portion of the work. A clever inventive man who has a wide range of reading and dashes at everything must hit something. But his philosophy is radically false. He despises inductive truth—he dogmatizes before he has learnt from nature the secrets of nature—he asserts without proof, and often too against plain fact; and a strange mysticism so obscures his writings and distorts his conceptions of arrangement, that to adopt and understand his views requires nothing less than a surrender of all our old conceptions of physical truth. One extract I will give, as it bears upon Geology.

"In the middle of the planet there is only earth, and nothing else; the middle is not hollow, does not contain any central fire, as has been imagined, nor air; and the science of Geogeny will show that no metal also could be contained in the interior of the earth."

GEOLOGY.

"The life of the earth consists in the formation of crystals. The being of the earth and of the crystal are identical. The solid planet Earth, has originated also according to the laws of crystallization.

"It is not, however, a single large crystal, the structure of which appears to be homogeneous; but it is crystallized in its smallest parts; it is an accumulation of crystals, which its atoms, integral parts, or *constituent forms*, present for our examination."...

"What in the crystal is called the cleavage of the laminæ, is in the earth *stratification*. The strike of the strata combined with their dip determines the crystal nucleus of the earth.

"The strike and d [illegible] strata happened without doubt according to defi [illegible] of crystallization, and has by no means been re [illegible] evating force, mechanical dislocation, or even [illegible] . .

"The land can [illegible] have an equal elevation everywhere abov [illegible] ause the crystal consists of edges, angles, an [illegible] ides. The mountain-tops are probably the ang [illegible] ntain-ridges or chains the edges, the plains the lateral surfaces of the crystal."...

"The earth is probably a *regular* net of crystal edges and angles, and thus of crystal surfaces also."

What have our Geologists been about for the last fifty years? They have not reached these elementary truths *that are without doubt*, or comprehended these *probabilities*.

"It must not, however, be thought, that all had happened in a gradual manner; that air was first converted into water, and lastly, after a lapse of some thousand years, the latter again into earth, without with the one element the principles conducting to the others being already and necessarily imparted. No; everything has been granted and determined at *one* stroke, even as with the impregnation of the ovum all the organs of the future embryo are determined, although they first develop themselves gradually."...

"These formations are found upon the whole to be arranged on the earth, in the order of time at which they were precipitated from the water. In the middle of the loftiest mountains is granite, then gneiss and mica-schist;

then follow quartzose rocks, clay-slate or porphyry, talcose rocks, and lastly on the edge of all these runs the chain of alpine or mountain-limestone. In the last of these formations are found fossil remains of corals and molluscous animals. For these formations fell first of all after the water had a solid bottom, and the granitic mountains projected above it."

We see something like this in the old Geognosy of Werner: but who would think of printing such nonsense now?

REPEATED SEDIMENTARY PRECIPITATIONS.

"The precipitating process is a process of polarization, which comprises several stages. In it there are moments of time."...

"The polarizing process will issue from a definite point, which is different from water, and thus form the point upon which the light operates with greatest force.

"This is solid ground. During the calcareous precipitation, there was no other ground present save that of the mountain-tops. It was thus from these that the calcareous precipitation set out.

"With each precipitation a greater number of mountain-tops made their appearance, because the water sank; for the calcareous earth is about three times denser than water.

"Such being the conditions belonging to the sedimentary periods, several consecutive centuries characterized by precipitations with repeated recessions and elevations of the water, elapsed and have left evidence of the time thus consumed."...

"Marine and fresh-water animals could therefore originate and perish alternately. And this is the explanation of the fact why banks enclosing both kinds of animals are found above and below each other.

"An alternating ingress of the sea is not therefore necessary in all cases to explain the occurrence of marine fossil remains. Such an assumption is also wholly inconceivable. Nor is alternating elevation and depression of the soil necessary to the explanation of this phenomenon."

Here we have antiquated, exploded geology dished up with transcendental philosophy. No practical geologists can swallow the compound.

TRAP ROCKS AND METALLIC VEINS, &c.

These I must pass over. It may be well however to tell the reader that

"All metals have originated through magnetism, through the radial polarity, or the conflict of light and gravity. Magnetism is the action betwixt light and darkness, periphery and centre. Magnetism as being a metal-generating action tends towards the centre of darkness of gravity."...

"Magnetism is still, however, not identical with gravity. Gravity is the centre abstractedly from the periphery; but magnetism is the centre only in relation to the periphery or light."

COAL.—It may be well also to tell the reader that

"During the electrical separation of the Basic of the earth, or during the communication of the aerial character to the Earthy, a body remains behind with positive character, or the *Coal.*

"Coal may be regarded as volatilized metal, as a metal which can change by the action of water or acid upon it into air. Black-lead is a coal which is directly associated with the metals."...

"The coal was, during the earth-formation, separated from the sea, yet not, or only rarely, by itself, but along with other masses of earth, while the sulphur rather accompanies the metals. Coal passes over into the earths, the sulphur into the metals."

The whole of this wonderful Chapter ends with a kind of moral, as it ought to do.

"Salt concludes the growth of the earths; it is the eruption or breaking out of the soul, as the metal was the body of earths completed. Both finally pass into a higher world, the metal into the *corporeal*, the salt into the *psychical*."...

"The spiritual activity, the soul of the earth has declared itself in crystallization, the spirit of the metals in magnetism, that of the Inflammables in electrism."...

PART III.—BIOLOGY.

PRIMARY ORGANISM.—"An individual (total, self-included) body, excited and moved by itself, is called *Organism*. *Organism is what individual planet is.* The metatype of the planet is organism; or a planet upon the planet is organism. The planet is not itself an organism, because it is not individual or galvanic in every point." (p. 181.)

"Organism is galvanism residing in a thoroughly *homogeneous mass*. The galvanic column is no organism, because it only admits the galvanic process just as the planet does, in individual places.....A galvanic pile, pounded into atoms must become alive. In this manner nature brings forth organic bodies."...(p. 182.)

"Accordingly, what would be organic, must be galvanic; what would be alive, must be galvanic. Life is not different from organism, nor also from galvanism. For life is verily the vital process. But the vital process is an organic, galvanic process. Galvanism lies at the basis of all the processes of the organic world. They are either modifications of it, or only its combinations with other and still higher actions. A living thing, which is not galvanic, is a nonentity."...

"Organic things are internal self-exciting numbers; the inorganic things are fractions."...

CREATION.—"*The primary mucus, out of which every thing organic has been created, is the sea-mucus.*"...... (p. 185.)

"The sea-mucus, as well as the salt, is still produced by the light. Everything takes place through the differentialization, or by the absolution of fixed poles on the earth-element. *Light shines upon the water, and it is salted. Light shines upon the salted sea, and it lives.*"...

"The whole sea is alive. It is a fluctuating, ever self-elevating and ever self-depressing organism.'...(p. 186.)

"The first creation of the Organic took place, where the first mountain-summits projected out of the water; and thus indeed without doubt in India, if the Himalaya be the highest mountain."...

"The first men were the littoral and mountainous inhabitants of warmer countries, and found therefore at once reptiles, fishes, fruit, and game for food."...

CHANGE.—"Death is no annihilation, but only a change. One individual emerges out of another. Death is only a transition to another life, not unto death." (p. 187.)

"This transition from one life to another takes place through the primary condition of the Organic, or the mucus."

"If new individuals originate, they could not therefore originate directly from others; but they must be redissolved into mucus. Every generation is a new creation."...

INFUSORIA.—"If the organic fundamental substance *consist* of infusoria, so must the whole organic world *originate* from infusoria. Plants and animals can only be metamorphoses of infusoria."...(p. 189.)

"Organisms are a synthesis of infusoria. Their generation is none other than an accumulation of infinitely numerous mucous points, infusoria."...(p. 190.)

"No organism has been consequently created of larger size than an infusorial point. No organism is, nor has one ever been, created, which is not microscopic." (p. 192).

"Whatever is larger, has not been created, but developed."...

MOTION.—"The Inorganic consists in motion having vanished from it, and in being simply mass. But the Organic consists exactly in this alone, namely, that the Massive has disappeared, or that the mass is in constant motion. The Organic becomes destroyed, so soon as motion disappears in it; the Inorganic is destroyed, so soon as motion enters it. Motion is therefore the soul, whereby the Organic is elevated above the Inorganic."... (p. 197).

NERVOUS SYSTEM.—"The nervous system has a life in itself, or the *internal* light-polarity that is without any relation to the organic mass. This action of the nerves is called *sensibility*, and its phenomenon, *feeling or sensation*. The system of sensation is the nervous system as sun in itself; in the motor-system it is as sun in a centre of planets."... (p. 203).

VEGETABLE KINGDOM.

"Roots obey under all circumstances the gravity, and would grow as far as the centre of the earth, were they to meet with no impediment; and there they would follow the revolution of the earth, and consequently become spirally convoluted upon themselves."... (p. 259).

"The straight ascent of the stalk also depends upon nothing else than gravity. The upper drops of mucus become lighter by means of greater heat and by decomposition in light and air, and they are therefore compressed by the heavier in the upward direction."...

"Impregnation is a simple act of light upon the matter, an *irradiation*, as it was termed, with such an exalted appreciation of its significance, by the ancients. The male imparts nothing in impregnation but the *solar ray*, or *fluid* *nervous mass, in its semen,* which awakes, animates, and inspirits the quiescent female."... (p. 274).

ANIMAL KINGDOM.

"The essence of volition or free-will does not reside, in a physical sense, in the consciousness of the action, but in the autocrasy; or in the ability to perform an action, without external or terrestrial influence. The æther-actions have originated from special polarity. Independent movements must therefore be such as have been produced simply by polarity, apart from material intrusion."... (p. 319).

"SENSATION is the relation of the Central to the Peripheric, of the sun to the planet; motion is the relation of the periphery to the centre, of the planet to the sun. The Animal emerges into being from the alternating play of the supremest antagonism in the heavenly bodies, the Vegetable from that of the terrestrial antagonisms."...... (p. 325).

IMPREGNATION.—"Already, in the course of the heavenly bodies, has the highest act of the animal, been preindicated or portrayed. The creation of the universe or world is itself nothing but an act of impregnation. The sex is prognosticated from the beginning, and pursues its course like a holy and conservative bond throughout the whole of nature. He therefore who so much as questions the sex in the organic world, comprehends not the riddle or problem of the universe."... (p. 398).

MESMERISM.—"To perceive objects in the distance, *i. e.* merely their polar influence, is called *Mesmerism,* or animal magnetism."... (p. 449).

"Now, if it is once possible for other senses besides that of sight to extend their perception into remote space, it no longer matters as to the magnitude of the latter. A feebly charged electrical machine only attracts bodies that are near, one strongly loaded, those which are more remote; such is the case too with weak and strong magnets."...

"The senses may therefore perceive their homologous polarities through other bodies, walls, and such like. By virtue of their perception, they stand in relation to them."...

"The vegetable, or in general the material body, appears therefore to the mesmerized like a strange world—they see their own organs—are *clair-voyants*. Mesmerism therefore comprises nothing which could contradict physiology."...

PERIODICITY.—"The human species requires three quarters of a year for pregnancy, one quarter for giving suck to the babe, and then it can again conceive. Pregnancy thus lasts a year, and has been based in the sun."...... (p. 454).

AUDITORY SENSE.—"Vibration is not a general movement to and fro, but a dissolution of the material bands. This dissolution can only take place according to the laws of the primary motion. They are rigidified in the solid masses as crystalline forms. Every law of motion is a crystalline form which has become free or spiritually manifested. Through the vibration forms are engendered in bodies, which are commensurate with the substance and form of the mass and the degree of vibration. These forms, being as it were the ghosts or phantoms of crystals, are called *sonorous figures*."... (p. 470).

"Melody is a retrogression of the matter into æther, of the formed world into the primary world; through melody is the spirit of the world revealed. The ear is the first liberation of the animal from all terrestrial matter; through the ear the animal becomes for the first time spiritual."... (p. 471).

"Melody is the voice of the universe, whereby it proclaims its scheme, or its innermost essence. Hence the wondrous, mysterious action of harmony, the secret sovereignty of music."...

Speech.—"With speech Man creates unto himself his world. Without speech there is no world."... (p. 472).

"Through speech Man becomes acquainted with or learns to know himself; through it he becomes a self-substantial essence, which resembles God, because it creates for itself its world, and recognizes itself, *i. e.* speaks."... (p. 473).

"Speech originates gradually like the organs, like Man. Speech grows like a plant; at first it is only root, next it puts forth a stem, then leaves, and finally blossoms, when it is the perfect expression of the animal body."... (p. 473).

Optic Sense.—"In seeing we perceive the æther, as to how it becomes world; in hearing we perceived the world, as to how it became æther. Seeing and hearing are opposite functions; the first indicates the creation, the latter the return of creation into chaos."...

"Without the ear there would be no understanding, without the eye no reason."... (p. 475).

Sensorial Fishes.—"Here belong the Chimæræ, Sturgeons, Sharks, and Rays. The last ought to be held as higher in rank, partly on account of their slender tail, partly because the huge Rays, which are called Cephalopterus, have the anterior thoracic rays free and so moveable that they can seize their prey with them as with hands. All lay, with the exception of the Sturgeons, large and leathery ova, and in this approximate pretty closely to the Reptilia." (p. 626.)

"It has been already remarked, that the large Cartilaginei would not pass correctly into the others, and obviously seem to claim the highest post. At some later period the principle may probably be discovered whereupon their union with the higher Osseous fishes depends. Both are at all events Abdominales."... (p. 627).

Psychology.—"Infusoria have only sensation, nothing else. ... Their spiritual life is, in some degree, a mesmeric condition....By mesmerism they find their food, perceive the light, and become transparent unto themselves; just as they are really in a physical point of view." (p. 655).

"The mind, just as the body, must be developed out of these animals. The human body has been formed by an extreme separation of the neuro-protoplasmic or mucous mass. So must the human mind be a separation, a memberment of infusorial sensation.

"The highest mind is an anatomized or dismembered mesmerism, each member whereof has been constituted independent in itself."...

"A Philosophy or Ethicks apart from Physio-philosophy is a nonentity, a bare contradiction, just as a flower without a stem is a non-existent thing."... (p. 656.)

"The reason why one has hitherto rambled about in Pneumato-philosophy without ballast and without compass, depends solely upon the disregard which has been paid to the science or knowledge of Nature."...

"Spirit is nothing different from Nature, but simply her purest outbirth or offspring, and therefore her symbol, her language. With such a basis as this, we shall no longer pursue the *ignes fatui* of the mind, but first of all endeavour to banish them into the provinces or realms of Nature, and there co-ordinate them in conformity with her laws; then for the first time shall we recognize the flaming lights of the mind and the divine voices, which all matter proclaimeth through the speech of Man.

"He, who were once in a condition to reveal or disclose this conformity of Nature's phenomena with those of Spirit, will have learnt the philosophy of the latter."...

FUNCTIONS OF SEXUAL ANIMALS.—"The liver is the soul in a state of sleep, the brain is the soul active and awakening. In it the spirit broods unconsciously for years, and then breaks forth fearfully, as capriciousness, tyranny, and sorrow, but also as earnestness and strength.

"Circumspection and foresight appear to be the thoughts of the Bivalve Mollusca and Snails.

"Gazing upon a Snail, one believes that he finds the prophesying goddess sitting upon the tripod. What majesty is in a creeping Snail, what reflection, what earnestness, what timidity and yet at the same time what firm confidence! Surely a Snail is an exalted symbol of mind slumbering deeply within itself."... (p. 657).

FUNCTIONS OF THE PANÆSTHETIC ANIMAL.—"The universal spirit is *Man*.

"In the human race the world has become individual. Man is the entire image or likeness of the world. His language is the spirit of the world. All the functions of animals have attained unto unity, unto self-consciousness, in Man."... (p. 662).

"Man expresses the ultimate goal or purpose of Nature's design." (p. 663).

"The art of War is the highest, most exalted art; the art of freedom and of right, of the blessed condition of Man and of humanity—the Principle of Peace."... (p. 665).

I have not made these long extracts to throw ridicule on Oken's scheme of Nature; but to bring out the aim and bearing of his Physio-Philosophy. No extracts are made from the really valuable parts of his work, where he discusses the functions of individual organs and their meaning in the archetype of nature, or where he gives us schemes of classification.

No. IX.

Additional Remarks on "The Vestiges of Creation." Supposed à priori reasons for the scheme. Its moral consequences. Summary of inductive reasoning, &c.

(p. clx. and p. cccxxiii.[*])

I HAVE thrown the matter of this Note into the Appendix, that I might not encumber the Preface by multiplied quotations. Enough has, I think, been stated in the text to satisfy the general reader. Those who are interested in the geological argument will perhaps think it worth their while to read this additional note.

Why has not the Author of *The Vestiges* ventured at length to publish his name? The answer to this question is plain and obvious. An anonymous title-page is as good as a wall of brass to any man who has taken up a rash hypothesis, and made up his mind to defend it at all cost: and he may shift his ground as often as he pleases, and change his colours without a blush, so long as he wears a mask. He began his work without any severe knowledge of natural philosophy, or of the exact methods by which men in past ages have learnt to reach its higher truths: and he seems to have done little since to make himself a master of these methods. Perhaps Nature tells him not to attempt this task; for it is far more grateful to the imagination and the senses to be flying in fancy through the airy regions of an hypothesis, than to be toiling along the dull, laborious track of true knowledge.

He was however well versed, from the first, in the jargon of a very shallow scheme of materialism built upon a misapplication of craniology, and he had ample stores of knowledge, more or less exact, that he had culled from a cycle of second-hand elementary reading. With this stock in hand he took on himself the profession of a high transcendental philosophy.

---

[*] The reference to this Note, at the foot of p. CLX., was omitted by mistake, during the passage of a sheet through the press: it appears, however, in the list of *Errata* and *Corrigenda* prefixed to the Preface.

Of the rank materialism of some French writers he knew something; and he could quote Comte as a demonstrative authority, while it is certain that he did not understand one word of what he quoted. The scheme of transmutation given by Lamarck he must have known; but of the works of Oken (the great modern high-priest of the theory of development) he seems to have known almost nothing. At the same time he appears to have very little regarded the most striking phase of modern materialism; and he boldly launched his pantheistic arguments, without ever dreaming that, on logical grounds, he must himself become a Pantheist. But he was a man of lively imagination, and had it seems a well tried, and certainly a ready pen. He had heard of the scheme of transmutation: he believed what Geologists then told him, (and what many of them continue to believe true)—that there was a time when Fishes formed no part of organic nature—and that Fishes, Reptiles, Birds, and Mammals, came into being in successive periods, and after long intervals of time. These were the elements of his "grand generalizations."—Out of these assumed facts he took up his theory of development. No wonder that this old theory became the child of his affections, for it chimed in, most harmoniously, with his adopted scheme of phrenological materialism.

Fishes do not, however, now breed Reptiles—Reptiles do not breed Birds or Mammals—Mammals do not shift their grade and breed Men. But, said the Author, they did breed after this fashion in ancient days, and the facts of Geology give us the proofs we want. Species are things fugitive and ill-defined; we take "modest steps;" we make no transcendental "leaps in the development process;" we ask only for "natural means" to do the whole work of transmutation; yet the facts of Geology bear out our theory. So stood the argument when first published by the Author.

He had not, to all appearance, examined a single quarry; his knowledge of Geology was incorrect and meagre; and where he professed to give details they were not always drawn from the best sources, or on a level with the knowledge of his day. Yet out of this little modicum of knowledge he span his theory, as he told us, in solitude. He knew full well that it must be tested by an appeal to the evidence of facts. But how did he handle this evidence? He handled it either with very little knowledge, or very great dishonesty. He asserted, again and again, things most contrary to fact: and when convicted on these points, he patched, shifted, refitted, and explained away his early statements as no writer living would have dared to do with his face uncovered. To add to our amazement at these strange sinuous movements, he told us in his *Explanations* (p. 65), "that it is humiliating to have to answer an objection so mean"—that he never asserted "that the animals came in this order—that he only put the *words* into this arrangement, in accordance with the custom commonly followed in describing the ascending grades of the animal kingdom!" I affirm in reply, that there was no such reservation in the early editions of the *Vestiges*—and that the Author, not in one instance only, but in many, gave us (not wishing to deceive, but in ignorance of facts) a supposed order of Geological precedence which was utterly untrue; and at the same time put it before us as an illustration and confirmation of his general argument.—But he did battle under the guard of a visor, which he will never think it prudent to lift up.

There are other reasons why our Author may still wish to conceal his name. He had offended against all the rules of severe induction, and therefore could look for no favour from men of severe science. He had done his best to destroy the force of moral evidence, by confounding material with moral, and pretending to class all social acts as the unbending consequences of a stern physical necessity. Hence, he could look for little sympathy from those who delight in schemes of social improvement, or in questions bearing on life and morals. Still more had he offended against the belief and feelings of all religious men, whatever their name or communion. For in his scheme everything that is supernatural—everything out of the vulgar course of material nature—is but antiquated superstition; belongs to the nonage of our race; or is to be set down to the diseases of a brain tainted by the exhalations of a Bœotian fog.

Having found little sympathy with men of science, he turns round on them, and scorns them as feeble guides who are sinking in the mire, or tottering under the load of their worthless knowledge: and as for facts, he is almost indifferent about them; for should fifty per cent of his quoted examples fail of application, they will not much affect his transcendental flights of reasoning! And as for the misgivings of religious men, they are nothing better than the cant of hypocrisy or cowardice—the mere tricks of dishonest men, who are trying to shift on to the shoulders of the Author of *The Vestiges* a burden that had been first put on themselves by bigots and fanatics! Against all this injustice he appeals (as we have seen) not to the facts brought out by science, and to the sober deductions of scientific men, but to the suffrage of the multitude.

That I may not bring charges without proof, I quote two passages from the *Explanations*—"If men, newly emerged from the odium which was thrown upon Newton's theory of the planetary motions, had rushed forward to turn that odium upon the patrons of the dawning science of Geology, they would have been prefiguring the conduct of several of my critics, themselves hardly escaped from the rude hands of the narrow-minded; yet eager to join that rabble against a new and equally unfriended stranger, as if such were the best means of purchasing impunity for themselves" (p. 171). In like spirit he insinuates that the nebular hypothesis is received by some persons with less favour than it was formerly, only because of the use that he himself has made of it. "The hypothesis (he tells us) has been favourably entertained in many authoritative quarters during the last few years, and probably would have continued to be so, if no attempt had been made to enforce by it a system of nature on the principle of universal order" (p. 8). The first of these two quotations is a libel on the honest convictions of many good men, who, holding firmly to their religious faith, are at the same time ready to listen to any material truth that is presented to them on good evidence. The second seems to prove that an Author's vanity may sometimes strangely triumph over his candour. So far as I am myself concerned in these remarks, I may refer the reader to the preceding Discourse (p. 27)—to Note (D) of the Appendix—and to No. I. of the Supplement; and if he think it worth his while to read the pages here referred to, he will have the means of judging for himself.

But another question arises. Can an author, who imputes such base motives to others, have himself any high feeling for the sanctity and severity of philosophic truth? I think not: but I accuse not our Author of any wilful fraud upon his readers. His mind has not been trained to understand and grasp the real essence of solid inductive evidence; and, on that account, he is disabled from rising to any just conception of the exalted grounds of philosophical belief in other men, or of rightly comprehending their motives, or their judgments, on the higher questions of physical truth.

I crave the reader's patience while I discuss once again, and in a few words, a question of no small interest. If I draw my conclusions fairly from facts of observation or experiment, they cannot but be true; and I have a right to publish my conclusions, however much they may clash with the venerated prejudices of my neighbours. In like manner, on religious and moral questions, I commit no moral wrong by arguing honestly from admitted grounds of belief. From infirmity, or want of more ample knowledge, I may wander far away from what is true; and then I must bear the consequences of my own ignorance or folly: but I have a moral right to publish my opinions if I do so in sincerity, and try not to enforce them by dishonest means—by evasion and suppression—by impurity—or by scorn and mockery, not levelled merely against absurd conclusions, but put on in the very aim of distorting or concealing truth. Were it not so, civilized society would be but a great band of slaves, and religious men would be degraded into the mere unthinking creatures of a despotic authority; without any power of obeying the high command of God—of honouring him by a reasonable service.

On the other hand, I have no right to toss out into the turbid whirlpool of debate any fantastical hypothesis that may have started into life within my brain; more especially, if thereby I put myself in collision with the faith and feelings of the sober men around me. If this be true in questions of physics, still more is it true in questions bearing on our social conduct or religious belief. When a man offends in this way, he deserves and meets with very little mercy. Because men are equal in the sight of God, the socialist or the robber may hold that therefore in society they should have all good things in common—that property is usurpation—and that one who has less than his share has a right to help himself. We deny his principles, and we wage open war with their application. We attack not the Author of *The Vestiges* (or any other Materialist of the same school), because on many grave questions his conclusions differ from our own; but because he published his hypothesis without having tested it, or because he pretended to test it by a flagrant distortion of facts, or a misconception of their meaning. It is on these points that we first join issue with him; and little does it become him to tell us that we also wear a mask (though more transparent than his own)—that we are acting the part of tricksters, and soiling our tongues with the cowardly cant of hypocritical pretenders.

The continental Materialists and Pantheists speak out more honestly and plainly. The extracts of the previous Note (No. VIII.) shew us what Materialism is, and what it ends in: and what a wreck a clever, inventive, and well-informed man may make of sense and reason, if he try to pass over the wide ocean of human knowledge without a rudder or a compass. Oken (the great hierophant of transmutation) tells us that man is "God wholly manifested ... is God become man ... that no organism is or ever has been created which is not microscopic ... that man was not created, but developed ... that Plants and Animals can only be the metamorphoses of Infusoria ... that putrefaction is nothing else than the division of organisms into Infusoria ... a reduction from the higher to the lower way of life ... that Death is no annihilation, but only change ... that death is only a transition to another life, not unto death ... that dying is only a multiplication of self," &c. &c. Couple these statements with the belief that there is nothing immaterial in nature — that conscience, moral sentiments, and abstract thoughts, and the whole body of treasured truths, are organic material functions, and nothing else; and then we have a full-fledged Pantheism ending in the deification of man. But his godlike attributes are soon to lose their personality and pass away; for on this scheme of rank materialism we have the whole history of creation, life, and death; and there is not the shadow of any personal hope or aspiration that is beyond it. Man was created like the beasts—he is the progeny of beasts—and with the beasts he perishes personally and for ever. May God for ever save the University of Cambridge from this base, degrading, demoralizing, hopeless creed!

But some of our British Materialists are far less plain and honest in their views. While they profess only a philosophic Deism, they preach the doctrines of material Pantheism. They talk of religion and Christian charity, while they scoff at any supposed distinction between soul and body—lop off any semblance of religious sanction beyond the authority of material nature, and virtually deprive God of His Providence and Personality. How far any charges such as these apply to the Author of *The Vestiges*, I do not well know; for his language and his views on some points are inconsistent. I solemnly disclaim any wish of misrepresenting him; but this he seems to tell us (in words too plain to be misunderstood) that any conception of revealed or moral truth, beyond what we derive from our common physical nature, is only a dream of the world's children, or a phantasm of a stolid brain. And yet he scruples not to tell us that the aim of his work is purely scientific, and that we have no right to oppose any moral objection to it!

Leaving, for the present, these grave questions, I come to some rather minute points that were little suited to the discussions of the Preface, and better fitted for a place in this Note. In a previous number of the Supplement I have quoted two examples of the Author's pleasantry (*supra*, pp. 209, 210), and I here quote a few specimens of his critical skill.

(1) "The Edinburgh Reviewer," (he tells us, *Explanations*, pp. 170, 171) "speaks of the whole works of the Deity as *vulgar nature*. I feel that the impiety which such an idea expresses to my sense, is only impiety to me, who cannot separate nature from God himself; but it is not necessarily so to him, whose education has given him peculiar and, I think, erroneous conceptions on this subject." Our Author's horror at the Reviewer's impiety is touching, and his candour is above all praise. Again and again, I have, in this volume, used the word *vulgar* in the same meaning. In its original and old-fashioned sense it conveys no notion of what is base and sordid, but simply of something that is common, and in the ordinary course of things; and because, when used in this sense, it is somewhat old-fashioned and classical, it serves a good purpose in natural history, by giving a definite meaning to many a sentence

which might be, perhaps, ambiguous without it. On this account only have I used the word *vulgar* in the above sense, and from no affectation of employing a pedantic or antiquated form of speech. This trifle would deserve no notice here did it not help us towards the solution of a very obscure question. The passage above quoted proves that the anonymous Author never had a name given him at the baptismal font of the Church of England. Had his ears been familiarized to the good old English of our liturgy he would have better comprehended the meaning of the word *vulgar*, and been spared from all his horror at the *impiety* of such an expression as *vulgar nature*.

(2) His next example is, perhaps, more formidable: for he accuses the Edinburgh Reviewer of downright fraud and sophistry. "The Reviewer" (he tells us) "had no title to assume any plan of development, and to represent his victory over *that* as a triumph over the hypotheses of his Author. In such conduct he has thoroughly vitiated the whole fabric of his criticism, and left it in reality no pretension to remain for a moment in court." (*Explanations*, p. 77). Is this charge true? If true, it is formidable; but it is utterly untrue. The Reviewer assumed no plan of development, and advanced no scheme of nature. He obviously considered all published schemes as partly artificial, and contended that none of them conveyed anything like a perfect notion of the archetype and history of creation*. He tracked the Author through his tangled web of hypothetical assertions, brought them, (as far as possible) one by one to the test of facts; and by that test, and that test only, denied the truth of the assertions, and thereby upset the baseless hypothesis that was pretended to be built upon them.

I hardly need repeat what has been stated in the Preface (p. ci). It matters not what scheme of nature we take as the basis of our argument. Let it be circular, or divergent, simply linear, or on a thousand ascending parallel lines, and the result is still unchanged. Whatever scheme we take, if we try to evolve from it the theory of development, we find ourselves, at every turn, in the same rude collision with the facts of geology. Out of no scheme (however complicated) can we construct an ascending scale that falls in with any sane theory of development, and at the same time runs in parallelism with the true historical development of the organic world as we read it, where it is plainly written, in the old book of nature.—But there is nothing new in our Author's tactics. He knew that in his first four editions he had committed himself to the assertion of facts which could not be defended; and he therefore took up the language of an assailant. As for the Reviewer, he must have been no less than a prophet to have anticipated the Protean shifts and sinuous movements made by our Author, between the successive scenes of his changing drama of development.

---

* No words can, on this point, be stronger than those given in the *Edinburgh Review*, (July, 1845.) p. 10.

(3) He affirmed hypothetically, that the marvellous succession of animal forms was brought about, during the epochs of geology, in the way of natural generation. Against this the Reviewer argued by a denial of the hypothesis, and by an appeal to facts. Let us quote one or two examples of the Author's reply: "The fallacy of the Reviewer" (he tells us, *Explanations*, p. 32) "consists in sinking the great broad palpable facts of the case, about which not the least doubt anywhere exists, and giving prominence to certain facts of far inferior magnitude, and comparatively more obscure, but in whose obscurity there is a possibility of creating a kind of diversion." Again, he writes in the same spirit (p. 66), "What strikes me is the extraordinary narrowness of a mind which sees nothing indicative of natural procedure, no hints towards great generalizations, in the simple fact of reptiles following upon fish, in this grand march of life, through the morning-time of the

world."....."Despising, however, the great fact, which shines through these obscurities, the Reviewer, and I am sorry to add geologists generally, can only fasten upon such particulars as may be made out to be difficulties in the way of generalization" (p. 67).

The writer, perhaps, does well to brave out a bad cause by insulting language, and a confident assumption of superior intelligence. But his reasons, after all, are but a bold and plausible misstatement of the question in debate. The facts of the Reviewer are quite as certain as the facts advanced by the Author of *The Vestiges*. The magnitude of the facts has nothing to do with the question; and in truth there is no real difference in their magnitude. It is just as certain that the highest genera of the Class of Fishes were created first, as that Fishes preceded Reptiles in the order of time. Each of these conclusions is grounded on induction from facts, and not on demonstrative evidence. Some persons may contend that our induction is, in both cases, imperfect. If such be our belief, we are bound to abstain from any positive generalization; but if we do generalize, it must be from such facts as are known. If we pretend to generalize from hypothetical facts that may hereafter be discovered, we only mock the common sense of our readers. The theory of development cannot be true on the whole if it be not true in its several parts. So far as geology bears on the question, the argument is resolved into an interpretation of acknowledged facts: but how are we to interpret or enumerate the facts without a comprehensive study of details?

Allowing it as probable, on the evidence before us, that Fishes preceded Reptiles, does it follow that Fishes procreated Reptiles? "Yes," says the Author; and they must be men of "extraordinarily narrow minds" who do not accept this "grand generalization." But where is the starting-point, and what laws of organic nature has he to rest upon? Living nature tells him a different tale, and the great organic sequence of geology, when honestly and carefully sifted, most flatly contradicts him. He reverses the whole order of inductive reasoning by arguing from the unknown to the known: and he forgets that "grand generalizations," when first thrown out in the early history of an advancing science, are often nothing better than the sportive fancies of rash men—that no merit belongs to a generalization which is not suggested by experience—and that in every case there is very great demerit in torturing the facts of nature that we may bend them to our hypothesis.

(4) Our Author is a perfect Proteus. His face we have never seen; but no specimen, in the vast series of his own hypothetical ancestry, ever changed its colours more rapidly than himself: nor is it an easy task to track him along the coils of his long-continued sinuous movements. In one page of his *Explanations* he laughs the Reviewer to scorn for drawing any argument from the fossils of our oldest known groups of strata. In another page he rebukes the Reviewer, and in no measured phrase, for denying the proof (drawn by himself from the same evidence) that sea-weeds existed before land-plants (p. 63). We cannot allow him in this manner to blow hot and cold on the same question.

Let me here remark, that Geology shews us comparatively little of what was doing on the bare surface of the earth during successive epochs. The sea, for obvious reasons, was the great geological storehouse. In the deposits of shallow seas we find, here and there, the stray productions of dry land; and in lacustrine deposits these productions are, usually, more numerous. But in the deposits of a deep sea we have no right to expect, and we very seldom find, many traces of the far-drifted organic structures that flourished contemporaneously on the land. To use the Edinburgh Reviewer's words, "it may be true that sea-weeds came first, but of this we have no proof:" for our oldest fossil sea-weeds are found in the deposits of a deep ocean, and therefore give us little help if we wish to speculate on the primeval organic conditions of the land. In one word, we either know the earliest conditions of organic life or we do not. If we do not, we then have no right to theorize on the question: and if we do theorize, we are bound to theorize consistently with such evidence (humble though it be) as nature has put before us. But our Author has no such forbearance. Theorize he will, no matter what the facts may tell him. He has adopted a universal scheme of nature—he has made some "grand generalizations," and by them he will abide through right or wrong*.

(5) Arguing on the same principles, the Author, as a matter of course, contends that marine Mammals preceded the terrestrial. In support of this view he quoted the supposed example of marine Mammals' bones in certain beds below the Stonesfield Slate, and made (as we have seen) his *mistaken facts* the topic of a sneer against the Edinburgh Reviewer. When the Reviewer affirmed that the two Marsupials of the Stonesfield Slate were the oldest Mammals yet discovered, he simply stated a fact. Had he gone a step farther, and affirmed that no Mammal's bones (whether terrestrial or marine) would ever be discovered at a lower level, he would have advanced a very rash and unwarranted conclusion. But he did no such thing. I believe, on the evidence of fact, that Cetaceans existed during the middle period of the Oolites; and I cannot give any reason why they *might* not have existed during an earlier period. In like manner I know that Marsupials lived on the dry land during the lower Oolitic period, and I can give no secure reason why

---

* In the previous extracts, the reader may find Oken's views on the beginning of life (*supra*, pp. 239, 240). "*The primary mucus, out of which every thing has been created, is the sea-mucus.* The sea-mucus, as well as the salt, *is still produced by the light. Light shines upon the water, and it is salted: light shines upon the salted sea, and it lives!*" May not this Author have a fall, like his great prototype Icarus, if he presume to soar thus high among the mysteries of creation?

they *might* not have lived on dry land during the time of the Trias.

There is, however, connected with these Stonesfield Marsupials another criticism, to be shortly noticed. The Edinburgh Reviewer contended that they had no organic base to act upon — in other words, that there were no organic types in the older deposits from which these two genera of Marsupials could spring in the way of natural generation. He certainly was not ignorant of the fact, that the foot-prints of birds had been seen on beds of stone that are supposed to be older that our Oolites: but he was not so far advanced in the history of nature as to know that geese could hatch rats, or that kangaroos could leap out of the eggs of cassowaries. But what is our Author's very courteous reply to the Reviewer's remark on the Stonesfield Mammals?—"It would appear (he tells us, *Explanations*, p. 90) that the Reviewer is simply ignorant of this department of natural history, and, with the self-esteem which often attends upon ignorance, he has somewhat unluckily ventured to give a positive contradiction to that which is incontestably true."

What may have been the Reviewer's ignorance or knowledge, matters very little; for, like our Author, he is a mysterious person who wears a brazen mask. But speaking plainly for myself, I adopt the Reviewer's assertions to the letter; and I am reckless of the imputation of ignorance or falsehood, even from our well-informed, courteous, and cautious Author. For I was present at all the meetings of the Geological Society of London, when the true generic place of the Stonesfield Marsupials was settled by Professor Owen, only after a protracted and very animated controversy. He dwelt on their affinities with other parts of the animal kingdom, and contended that they were of the very type we might have looked for among the records of so old a period. He believed then, as geologists believe now, that there was a grand archetype in nature—that there were harmonious laws in the historical development of the kingdoms of nature—that the earth had been gradually matured into what it now is—and that there were gradual changes in all the kingdoms of animated nature corresponding to the gradual changes of physical conditions. Neither he, nor any member present, believed that the opposite extremes of the great complex scale of nature were set chronologically in juxta-position, or that one end of the complicated scale had ever been doubled back upon the other. At the same time neither did he, nor any other member of the Society, ever throw out a hint that the old Marsupials had a true ancestral base shewn among the organic types of a preceding period? They were, to a man, in such infantine ignorance on this question, that any one of them would have been laughed to scorn who had dared to tell the Society that the march of nature during these morning-hours was plain and easy—that some old Struthio had dropped an egg which by a cunning incubation had been hatched into a Mammal—that it was but a very simple process for a rising Struthio to cast its feathers, to put on a garment of hair, to discharge its old bill, to transform every wheel and cog of its inner mechanism, and then to hop out of its egg as a full-fledged Mammal. They would have told the vender of such a monstrous fable, that he was deserting the light of analogy and the plain road of physical truth—and that the serious assertion of such a genealogy, while it proved nothing else, proved him incapable either of discussing, or pronouncing a sane judgment on any grave question of organic nature.

(6) There is an argument advanced in *The Explanations* (p. 162, &c.), and repeated in all subsequent Editions of *The Vestiges*, as if it led to a kind of law: viz. that the perfection of the *fauna* of any country is in proportion to the time the country has been in the condition of dry land. Thus the Galapagos are supposed by Mr. Darwin to have been elevated "within a late geological period;" and Lizards,

Tortoises, and Birds, are the highest indigenous animals. "These islands (says our Author) had not the full time for the completion of the series, and it is incomplete accordingly." Take the whole theory of transmutation for granted, and all these facts may seem to run smoothly. But who, in his sober senses, will believe that the sea-weeds of the Pacific were transmuted into the grasses and shrubs of the Galapagos? We only know the geological date of the Galapagos by conjecture; and allowing that they are of a late geological period, the *flora* and *fauna* are much too far advanced to be accounted for by transmutation. If the rats and mice were imported, why may not most of the aquatic birds have come as colonists? If the terrestrial birds be truly indigenous, where are there, within these islands, the anterior forms of life from which they sprang by transmutation? The argument is most slippery and worthless; and the quoted example neither proves nor illustrates the transmutation theory. It only takes it for granted.

Another example is borrowed from Australia, which is called a new country—"one that has been belated in its physical and organic development" (p. 163). If we suppose the men of Australia to be colonists, we may conclude that the highest indigenous animals are Marsupials: but how are we to prove that this southern continent is a new country? The Edinburgh Reviewer, in a somewhat flippant note, written more, perhaps, in jest than earnest, told the Author that from its *flora* and *fauna* he ought to call it a very old country. This is described, it seems, by a Westminster Reviewer, as one of "the most complete miscomprehensions of reasoning he ever met with"...and "a warning to all believers in *ex parte* criticism." And our Author clenches the matter by gravely adding, "that the note would not be worthy of analysis, but that the self-complacency of the writer is so apt to impose upon readers who do not inquire for themselves." These, no doubt, are brave comments; and it is almost as rash for a man who has no visor to run tilt with a Reviewer, as it would be for him to thrust his naked hand into a hornet's nest: but as for the real geological evidence for the antiquity of New Holland, neither the Westminster Reviewer nor our Author ever seems to have wasted a minute's thought upon it.

Many good geologists have thought that the Flora and Fauna of the country belonged to an antique type; and Cuvier ventured on the hypothesis, that some portions of it had escaped the physical catastrophes which had afterwards modified the types of the animal kingdom in the parts of Europe which are best known. Whether he, and the Edinburgh Reviewer after him, were justified in hinting at any such conclusion, is a question not worth a straw; for the living species and genera in New Holland are very far apart from the species and genera of the Oolitic period: and all that we have a right to conclude, from the facts of the case, appears to be this: viz. that the climatal conditions of the Oolitic period corresponded nearly with the present climatal conditions in New Holland. Are there, however, any facts, untold in the Reviewer's note, to justify him in his denial, "of any evidence to prove that New Holland is a very new country?" I think there is good evidence for this denial; and good geological evidence to make it probable that the part of New Holland which is best known is one of the oldest countries on the face of the earth. This evidence, such as it is, I will try to explain in a few words.

We are absolutely certain that in a wide geographical region, through which now passes the Eastern coast-line of New Holland, there was a palæozoic marine fauna—that there was at the same time, within the region, dry land with trees and forests—that there were, during the same period, sand-banks and shingle-banks, and all the ordinary deposits of a shallow sea. But the sequence of organic life, traced among these long-continued deposits, was arrested near the base of the Oolitic system: and along many hundred of miles of the present coast-line no geologist has yet discovered one scrap of any well-marked marine deposit of the upper Oolitic, Cretaceous, or Tertiary age. What do we reasonably conclude from these negative facts? That the best-explored parts of New Holland were never submerged under the ocean during these vast periods of time; and that they have remained high and dry during countless ages until now. Had the known parts of this southern continent been submerged, again and again, like many parts of Europe, we should look for some proofs of submergence in Oolitic, Cretaceous, or Tertiary deposits; but we find them not: and this inevitable conclusion must stand (till it is upset by some, at present, unknown evidence)—that New Holland, as a country of dry land, is one of the oldest on the face of the Earth. The Reviewer, no doubt, knew this when he wrote his remarks upon New Holland; but did not think it worth his while to state the evidence. He made a slip, however, when he said that the Author of *The Vestiges* was inconsistent. He is nobly consistent: he never flinches from his hypothesis whatever be the facts, and when he deals theoretically with facts, he hardly ever blunders into what is right. The facts supplied by New Holland, as I have drawn them out with no warp from any hypothesis, thus give us, if we wanted it, a new argument against the theory of development; and also against the supposed proportion between the perfection of any living fauna and the past duration of the dry land on which it flourishes.

After a long blank in the old organic sequence of New Holland, we at length reach the traces of some conditions resembling those of Europe. We have traces of pliocene terrestrial deposits; we have gigantic Marsupials in certain caverns; and in some islands, of the southern hemisphere, we have gigantic birds: and these remains – mingled, as in Europe, with others that are not gigantic, and of the common type—belong to the predecessors, but not the progenitors, of the animals that now make the living *fauna* of the country.

There *is* an archetype in nature, and the works of nature, when understood, are in harmony among themselves.

(7) One example more of the Author's critical judgment, and I have done. Baron Cuvier (he tells us) made a mistake in 1826 in some speculations about a deluge. "May not he, then, be wrong also in his opinion regarding the development of species?" (*Explanations*, p. 99). And M. Agassiz (again he tells us) blundered in his explanation of "the constitution and movement of glaciers;" therefore he is liable to error; "and we must be cautious in accepting as an infallible dictum what he is pleased to say on the comparatively profound doctrine of organic development." Neither Cuvier nor Agassiz were great geologists; for neither of them had practically sifted the leading evidences of that science. *Ne sutor ultra crepidam* is a trite proverb, that applies to them as well as to feebler men; and to no man living does it apply more pungently than to our Author. It is but a sorry business to be raking up the blunders of great men; and who is so foolish as to call any men infallible? To have justified his criticism, and given it any point or meaning, he ought to have brought out some case in which Cuvier had blundered on an inductive question of physiology; or Agassiz, in like manner, had blundered in some great anatomical question connected with fossil fishes. "The erroneous and imperfect ideas, it seems, of great men often become an annoyance . . . because the weak and narrow-minded are so apt, afterwards, to seize upon such ideas, and brandish them in the faces of advancing truths." The general sentiment, here expressed, is true; but its application is ridiculous and vain. Advancing truth is the scheme of *The Vestiges,* and we are not, it would seem, to brandish against its face the conclusions drawn inductively by great men, like Cuvier and Agassiz, after labour almost incredible in the long examination of details bearing on the very question in debate!

I may here remark that our Author evolves many of his general propositions with a confidence which savours little of philosophic caution, and sometimes with a rash dogmatism worthy of the Physio-philosophy of Oken. We will give a few examples of this rashness from *The Explanations* and the sixth Edition of *The Vestiges.*

(1) There *was* dry land unreckonable ages before there were any land-animals" (*V.* pp. 57, 160). (2) "It is now fully ascertained that the various bread-forming grains, wheat, barley, oats and rye, are resolvable into one" (*V.* p. 232). (3) "The groves which formed the coal-beds might have been a fitting habitation for reptiles, birds, and mammals, as such groves are at the present day" (*E.* p. 151). (4) "Sex is fully ascertained to be a matter of development. All beings are, at one stage of the embryonic process, female: a certain number of them are afterwards *advanced* to be of the more powerful sex (*V.* p. 219, 220). (5) "Where the iguanodon lived the elephant might have lived" (*V.* p. 151). (6) "The sea of the Lower Silurian Era was capable of supporting fish, but no fish existed...I pin my opponents down to this amazing fact, that the sea for numberless ages was destitute of fish" (*E.* p. 45, 151. *V.* p. 57). (7) "It hence forcibly appears *that the theatres of life must have lain unserviceable, or in the possession of a tenantry inferior to what might have enjoyed them for many ages:* there surely would have been no such waste allowed on a system where Omnipotence was working on a plan of minute attention to specialities" (*E.* 151). (8) "The oldest palæozoic Placoïds—*the highest types of their class!*—it is barely possible to establish their being vertebrata at all...of their general inferiority there can be no room for doubt*" (*E.* p. 51). (9) The Devonian fishes (Ganoïds and Plaçoïds) "are manifestly of an inferior character to the two other Orders which afterwards came into existence." (*V.* p. 64, &c.) (10) "The human fœtus is often left with one of the most important parts of its frame imperfectly developed—the heart, for instance,

---

* Oken's opinion on this point will not, I should think, be suspected. *Supra*, p. 244.

goes no farther than the three-chambered form, so that it is the heart of a reptile. There are even instances of the organ being left in the two-chambered or fish-form...Seeing a complete specific retrogression in one point, how easy it is to suppose a simply natural process reversing the phenomenon, and making a fish-mother develop a reptile-heart, or a reptile-mother develop a mammal one. It is no great boldness to surmise that a super-adequacy of force (and the Author thinks a super-adequacy of force quite as natural as an under-adequacy) would suffice in a natatorial bird to give it as a progeny the ornithorhynchus, or give the progeny of the ornithorhynchus the mouth and feet of a true mammalian, and thus complete in two stages a passage from one class to another" (*V.* p. 229). (11) "Of the transitions or transmutations implied in the development-theory, the greatest, or most violent, are those few which took place in the passage from the invertebrate animals to fishes, from fishes to reptiles, and from these to the higher classes... Here, accordingly, shall we always find the affinities less distinct than elsewhere; and yet at all of them some connexions are visible, leaving the general fact of the transition indubitable" (*V.* p. 283).

I could easily multiply my examples of very rash assertions to four or five times the number; but I think it best to pause here, and to end my list with this *general and indubitable fact* of transmutation from Class to Class!

My general remarks on the assertions in these strange extracts (honestly quoted from our Author's books) must be short. Of the assertions conveyed under numbers one, three and five, of the above list, there is not the shadow of a proof. The assertion under number five may not be, perhaps, improbable; but it is purely gratuitous, and not worth discussing. Number two is not true, if we may trust the best living botanists. Number four requires a short comment. Number six is not true, as it is expressed in the Author's words. I believe, however, that some of our oldest known deposits were made in a deep sea, and on that account were unfit for the habitation of the old Ganoïds and Placoïds: and that these Fishes came into being when a fit habitat was found for them. Number seven we can only regard as a very rash conclusion, followed by a worthless, and, some will think, a profane comment. Numbers eight and nine are, I believe, utterly untrue. Their statements are not accepted by geologists, and are in flat contradiction to the classifications of Müller, Owen, and Oken. Numbers ten and eleven do require some notice, as they contain the pith and marrow of our Author's system.

In a certain sense it is true, that sex is a matter of development; for animals begin from a nascent fruitful germ, and after passing through a natural cycle of progressive changes, are at length perfected in every organ, are capable of maintaining an independent life, and, by the union of two sexes, of recommencing a cycle similar to that through which they themselves began and were brought to full sexual maturity. But where is the proof, that "all beings are, at one step of the embryonic process, female"? I know of none. If the assertion were correct, we ought to prove (as a part of the general economy of nature) that after the fœtal form has gained a sexual development as a female, it is afterwards so changed as to lose its former sex, and pass into a male. Is there a single case of this kind in the organic world? I never heard of one; and, unquestionably, such a transformation was never seen in the fœtal development of any of the higher animals. In the early embryonic state the nascent animal has no sexual organs; afterwards the sex is developed organically.

Two theories have beeen started on the question.—One supposes that the future sex is implied, or potentially determined, in the very first embryonic conditions. The other assumes that, in the first embryonic changes, there is no predetermination of the future sex; and that future conditions determine the point. Which of these two theories is right I know not: but the former is, I believe, supported by the best names, and is, in appearance, the most philosophical. Huber, and many other naturalists, have proved that the working bees are imperfectly developed females. By a particular treatment their full development is arrested. But "the bees can so modify a larva, which otherwise would end in a worker, that when the perfect insect emerges from the pupa, it is found to be a queen, or true female" (*Vestiges* p. 220). This was, no doubt, a very remarkable discovery; but I cannot discern in it any glimering of light to help us in deciding between the two theories. It merely gives us a most interesting case where, in one set of conditions (under the control of the hive) a female bee is arrested in her full development, while under another set of conditions (also under like control) a perfect female is brought to maturity. But where have we a proof, in such facts as these, that the male insect was ever in the condition of a female? We have no proof whatsoever. Bees are no exceptions to the general rule. In their early embryonic state they have no sex; and afterwards, through what conditions matters not, some pass into males and others into females. The singular economy of bees, and the history of their development, throws, therefore, no new light on either of the previous questions; and leaves them exactly where they were before. Had Huber been able to prove that the same larva might, by peculiar treatment, be developed either into a drone, or into a queen-bee, he would have done something towards settling a long-disputed question; but this he has not done. And were this point proved, it would not justify the assertion of our Author, "that all beings are in one state of their embryonic progress female; and a certain number of them are afterwards *advanced* to be of the more powerful sex." In these words he has given us a rash generalization, and an assertion of facts that is incorrect and unphilosophical.

But I must, in the next place, notice the argument drawn from certain unhappy cases of monstrosity. In some (fortunately rare) cases a child is born with a free communication between the lower chambers of its heart, the septum between its ventricles not having been completed. It has an imperfect Mammal's heart; but it is not true that its heart, considered as a whole, looks like that of any Reptile; and in other parts of its framework it is like all other children. Its imperfect heart is out of organic harmony with its functions. It is therefore a blue, miserable, and sickly child. Were it true that a blue child could grow up to a healthy blue manhood—that it could unite with another being like itself, and produce a human family of its own peculiar structure, we should gain a kind of *downward step* in the theory of development: for we should have a variety of the human family, of a lower grade, in one of its vital organs, than other human beings. But who ever heard of such a race?

Again, it may be true that a monstrous human fœtus may be born with a single heart. Every son of man has once lived in a watery fluid, and had a single (or two-chambered) heart; but never the heart of a perfect fish: and we can readily conceive (what indeed sometimes happens) that the progress of one organ should be stunted while the other organs go on to a natural maturity. But were such a monstrous human fœtus to be born alive, it could not continue to live in the air for a single moment. It would be organically more helpless than a fish; for it would have no gills to enable it to breathe in water, and it would want the apparatus which would enable it to breathe the air. By such a case of monstrosity the theory of development gains not one grain of help.

Among many lower animals, when the *larva* quits the mother, and maintains (like the tadpole) an independent life, we have a far more plausible shew of evidence for the theory, and among phenomena, moreover, which belong not to monstrosities. Our Author tells us that in such cases a specific transmutation is realized, although on a *descending grade*, and "that the progeny of a Reptile literally becomes a Fish" (*V*. p. 226). But mere resemblances, as we have said before, will not serve the purposes of his theory. The larva of a Reptile may look like a Fish; or the fœtus of a Mammal may, during one stage of its growth, have one portion of its structure in analogy with the corresponding portion of a perfect Reptile. But still he gains nothing, unless he can shew us a case of two monstrous larvæ, of perfect sex, producing a continued progeny on a lower grade than the parents from which they sprang. Such monsters would be organically in advance of all other larvæ, and might breed on this hypothesis a race of animals on a *descending* grade. But what naturalist has ever seen such larvæ, or such a degraded progeny, since men have employed themselves in the study of the works of Nature? Our Author's assertions are not anatomically true, and his theory gains not by this part of nature, when truly sifted, one atom of new evidence.

When the Author tells us (*V*. p. 224) that the cases of human monstrosity are cases of *under-adequacy* of development in a particular organ, he states what is physically true, and only what experience has taught us: but when he states that a *super-adequacy* of development seems as natural as an *under-adequacy*, and "that it is easy to suppose a simply natural process making a Fish-mother develop a reptile-heart, or a Reptile-mother develop a mammal one," he deserts nature, tells us of the conceptions of his fancy, and no longer of the inductions of his reason from the observation of what Nature does. He tells us of something out of harmony with Nature, and which no mortal eye has ever witnessed since the world began. And in pretending to hatch a Mammal from a web-footed Bird only by two stages of incubation, he theorizes without a fact to lean upon, talks of a law which violates every thing we know of law, and mocks the whole economy of Nature.

What conceptions a man may mature in the teeming womb of his imagination, is not a question for inductive physics. While we trust to Nature, we may send such abortive visions, along with all the idle dreams of ideal or material Pantheists "into (what Milton calls) a limbo large and broad, since called the paradise of fools." Cases of monstrosity, such as those above quoted, are cases of imperfection in early organic progress, and have a place in Nature. Cases of organic progress beyond the parental grade are cases unknown, and out of all Nature's organic cycles. We may fancy anything: we might make a scheme of Nature out of the wildest Oriental visions. I can fancy a rat to come by hatching from a goose's egg: and I can fancy, with just as much inductive reason (for while I *body forth*, out of the storehouse of my fancy, the *form of things unseen*, what have I to do with inductive reason?) a full-dressed, slippered pantaloon to start by natural incubation out of an owl's nest, and begin his pantomimic dances, to the delight of all who love to pry beyond the secrets of Nature.

The last passage (No. 11) in the list of quotations from *The Vestiges*, deserves, if I mistake not its purpose, a far sterner reprehension. I have a right to construct and publish a scheme of animated nature based on fact and observation, and I should do well to reflect light upon it by the aid of all kindred departments of physical knowledge within my reach: and if I can shew that my scheme of animated nature derives support or illustration from the past history of organic nature, as it is written in the old records of the earth, so much the better. If, again, my scheme derive illustration from a broad view of the development of organic life while in the fœtal state, so much the better. We all believe (as has been stated before) that there was an archetype of Nature in the prescient mind of the great Creator of the universe, and we fully believe that all parts of Nature are in harmony among themselves, and that the laws, under which they make their ordained movements, are as unchangeable as the attributes of the Godhead.

Again, if I take up (like Oken) a pantheistic view of material development, I have a right to shew that my scheme, or arrangement of the organic world (though in the first instance derived honestly and historically from fact and observation) is in harmony with my pantheistic faith, and gives it colour and support. But if, while I am evolving as a natural historian my scheme of Nature, I forget the duties of an historian; and, while I profess only to describe facts, covertly insinuate my theory, and describe Nature, not as she is, but as she ought to be in conformity with my theory, I thereby put a direct fraud upon my readers. Let any one who casts his eye over this page turn to *The Vestiges* (p. 283), and he will understand what I mean by this kind of logical fraud. The Author tells us, most truly, that in the animal kingdom connexions are visible between Class and Class. No one denies this; and were it not so, there would be an end of comparative anatomy, and of all that is built upon it. But when he tells us, that these connexions *leave the general fact of the transition* (from Class to Class) *indubitable,* while he uses in the same paragraph (p. 283) the words *transition* and *transmutation* as terms convertible, he thereby deserts the language of a natural historian, and imposes on the reader by the affirmation of an hypothesis. I think this remark not unimportant as a caution; and it applies to many other passages in the longest chapter of *The Vestiges* (p. 254...p. 368).

In one word—the beginning of some of the lowest animals, for want of microscopic evidence, is involved in inextricable obscurity. Known species do not change; for organic cycles, like all other laws of Nature, are unchangeable. There is no proof of any transmutation among well-established species, and there is (*à fortiori*) no proof or probability of any transmutations from Order to Order, or from Class to Class, in the actual world. And in the old world, though creation has been progressive on the whole—probably because adapted to progressive conditions—yet has this progress (when studied in detail) been so effected as to bid defiance to the pantheistic theory of development: so that were the theory made even probable by the phenomena of the living world, it would still be in direct antagonism with many of the most prominent facts in the old phenomena of extinct nature. I know that I am now doing little more than repeating what has been told before; but some may turn over the leaves of the Preface who will not trouble themselves with this Note; and some may, perhaps, read this Note who would not trouble themselves with the Preface.

If our Author, while maintaining his hypothesis, has been rash and inconsiderate in stating facts, he has been equally inconsiderate while quoting his authorities. Within the compass of two pages he has professed to muster against the Edinburgh Reviewer the names of Harvey, Grew, Lister, Meckel, Professor Owen, Dr. Roget, and John Hunter (*Explanations*, pp. 106, 107); and in another page (p. 56) he has sheltered himself under the names of Cuvier and Linnæus. Some of these are mighty names, and enough to make a strong man quail should he find them honestly put in array against him. Let us then shortly sift this evidence. Speaking of the palæozoic Fishes (Placoïds and Ganoïds), he denies their high organic type, in the first place, on the authority of Cuvier, who in his *Règne Animal* puts cartilaginous Fishes on a second grade, yet "in some measure *parallel to the first*." Such words as these (however taken) make very little for our Author's case; and it is notorious that Cuvier had neither studied the palæozoic Fishes, nor ever given an opinion respecting them. Moreover, in another page of the *Explanations*, our Author tells us that he had given up the linear arrangement of Cuvier; and he reproves the Reviewer, in no measured phrase, and talks of "turning him out of court," because he presumed to argue upon the linear scheme. Had the Author, then, any right, in page 50, to come back once more to the system he had deserted, in order to find an apparent argument against the Reviewer? There was clearly either a moral or a logical bar against his argument; and he had obviously no right whatsoever to take up Cuvier's system for one purpose, and, within a few pages, to discard it for another.

Next he tells us, "that as for these (palæozoic) Placoïds, (*the highest types of their Class!*) it is barely possible to establish their being vertebrata at all." ... But how is this position to be made good? By the misstatement of an anatomical fact, and by the authority of Linnæus, "who was so impressed by the low characters of many of this (cartilaginous) Order, that he actually ranked them with the Worms." But, in the name of common sense, what had the organic grade of Linnæus's worms—Cyclostomes—to do with the organic grade of the old Placoïds? I wish not to discuss this question here. I only give these facts in illustration of our Author's manner of using his authorities: and leaving the old Placoïds, we may affirm with great confidence, that had Linnæus seen the fragments of the noble Ganoïds that are found so abundantly in the old Red Sandstone and Carboniferous rocks of Scotland, he would, on his own system, have removed them out of their proper Class (as was indeed done at first sight by Dr. Hibbert and Professor Agassiz himself), and pronounced them Reptiles—so far are they elevated above all ordinary types of known Ganoïd Fishes. Such is the use made of the names of Cuvier and Linnæus.

Let us next come to Owen and Roget. It is notorious that neither of them holds to the theory of development; and little can be gained for it by special pleading on some casual sentence that may have found a place in their published works. I have alluded to these Authors before (supra p. xxxvii). "Mr. Owen says, that man's embryonic metamorphoses would not be less striking than those of a

Butterfly, if subjected like them to observation ... that the human embryo is first vermiform—next stamped with the characters of the apodal Fish—afterwards indicative of the Enaliosaur, and so forth" (*Explanations*, p. 106). Not one of these assertions was denied by Dr. Clark or the Edinburgh Reviewer: they only contended against the absurd and hypothetical conclusions that were drawn from the observed fœtal resemblances. They contended, for example, that a Mammal's fœtus never had the anatomical structure, or the reproductive organs of a worm—that it never breathed by gills, or had such a perfect ichthyic structure, that if thrown off by abortion it could live as a Fish, and in that Class continue its species—that the *hearts of Birds and Mammals do not pass through forms which are permanent in Fishes and Reptiles*, &c. &c. On all these points Professor Owen is in most literal agreement with them. What right then has our Author to trifle with the reader, by quoting the Professor's authority against the Reviewer?

I am anxious neither to overlook nor overstate a single essential fact that bears on the question. In the case of a Mammal, life begins in the manner above stated (p. xxix), and then advances by the fission and multiplication of the first vital germ. The living molecules then run by a specific, organic affinity into a *streak*, out of which is elaborated the backbone and spinal chord. The outside of the cylindrical streak is gelatinous, and by attracting phosphate of lime within its substance gradually becomes a bone: but the central line of the *streak* is albuminous, and by a similar process of attraction, or appropriation, passes into a true nervous substance, and becomes a spinal chord. On these points I can afford not merely to be just, but generous. Owen calls the *streak* "vermiform;" but the great Harvey actually calls it *a worm*. His words are as follows: "*Processus secundus* qui post quartum diem incipit, est primi cujusdam *concrementi*, quod ego vermiculum, seu *galbam* dixerim; vitam enim et motum galbæ obscurum præ se fert." *De Generatione Animalium. Exercitatio 55, de ordine partium in generatione.* Had our Author known this passage, he would I think have quoted it: yet he quotes the *name* of Harvey as an opponent of the statements of Dr. Clark, and a supporter of the theory of development.

I have before alluded to a quotation from the *Bridgewater Treatise* of Dr. Roget (p. xxxvii): but justice to that physiologist compels me to take some further notice of it in this place. The quotation from this *Treatise* is as follows: "that the animals which occupy the highest stations in each series possess, at the commencement of their existence, forms exhibiting a *marked resemblance* to those presented in the permanent condition of the lowest animals of the same series; and that, during the progress of their development, they assume in succession the characters of each tribe, corresponding to their consecutive order in the ascending chain." Let us admit all this, and let us admit further, and for the sake of argument, that it was "hinted at by Harvey, and afterwards shadowed forth by John Hunter," (*Explanations*, p. 107): but what does it prove for the theory of development, unless we can also prove something more during fœtal development than *marked resemblance?* unless we can shew some one case (which no one has ever done) where the fœtus (*e.g.*) of a Mammal is, during its progress, so *perfect a Fish or Reptile* that it might be thrown off by abortion and continue its species on the lower grade. As we have stated again and again, there is not the similitude of any evidence for such a change as this in Nature: and were it true, so as to become a law of Nature, it could only produce a multiplication or confusion of specific types, and no development (without the help of a new hypothesis) on any ascending scale. I am not however now dealing with this question; but, historically, with the testimony of certain quoted authorities; and I have now before me a letter from

Dr. Roget, in which he *complains* of the construction put upon his *Treatise* by the Author of *The Vestiges*. "I had hoped," he says, "when I wrote the passage (relating to the *unity of composition*), that by designating the successive stages of fœtal growth as exhibiting a *resemblance only* (not a true analogy) to the forms of the lower animals *in the same series*, I should have been secured from the imputation of being a disciple of that school, or of having adopted that hypothesis (*i. e.* the theory of development)....I certainly never ventured to assert that a Mammal-fœtus, in any stage of its growth, ever breathed by gills, or exercised any of the functions peculiar to Fishes or Reptiles—for such is not the fact." But we have a better evidence even than this for ascertaining the opinions of Dr. Roget—we have his matured judgment, on the question in debate, formally recorded in his *Treatise*. "Whatever (he says) may be the apparent similarity between one animal and another, during different periods of their respective developments, there still exist specific differences, establishing between them an impassable barrier of separation, and effectually preventing any conversion of one species into another, however nearly the two may be allied. The essential characters of each species, amidst occasional varieties, remain ever constant and immutable" (*Bridgewater Treatise*, Vol. II. p. 636 of the first and second, or p. 569 of the third Edition). This quotation is not taken from the middle of a great work where it might easily have escaped notice; but from a concluding summary, on the "Unity of Design," which no *careful reader* could possibly have overlooked. If our Author had read it, would he be morally justified in afterwards quoting Dr. Roget as an evidence on his own side, and in support of the theory of development? I might leave this question in the hands of better casuists than I am.

I have an undoubted right to draw my own conclusions from the facts brought out by other men who differ from me in opinion; but I have no right to quote their works in such a way as to put them among the maintainers of opinions which they have formally repudiated. No one denies the wonderful sequence of phenomena during embryonic growth in the teeming womb of Nature, or pretends to undervalue the discoveries in this part of Nature brought to light in modern times. No one denies the high meaning of analogies in the works of Nature, made manifest to our enlightened senses and bearing the stamp of one great contriving Mind. Who has decried the researches of those great men who, since the days of Harvey, have continually advanced our knowledge of fœtal development? And who has pretended to overlook the value of resemblances, which, before long, may help us to a more perfect scheme of classification, and enable us to make some approach towards the archetype of Nature? The Edinburgh Reviewer did not dare to level a single shaft against the labourers in this field of truth. He protested only against a misinterpretation of these labours by shallow, ignorant, or rash men; who, by a flagrant abuse of facts, built up an hypothetical scheme that was out of Nature—that, in defiance of Nature, broke in upon the constancy of organic laws, warred against moral sense, and had not one fragment of any true inductive evidence to rest upon. It was against such a scheme as this that the Reviewer lifted up his voice, and pronounced it, "from first to last, nothing but a pile of wildly gratuitous hypotheses" (*Explanations*, p. 107). But I am on the subject of authorities; and I here dismiss the names of Linnæus, Cuvier, John Hunter, Owen, and Roget; and little has the Author gained by producing them.

"The Edinburgh Reviewer," says the Author (*Explanations*, p. 103), "puts trust in Dr. Clark of Cambridge, while I have resorted, for the support of my general theory, to the views advocated by other physiologists...For the one authority that he has called into court, it would be easy to summon many as good on the other side; for instance, Harvey, Grew, Lister, and Meckel" (p. 106). Meckel was a physiologist of good name during the last century, but I know nothing of his works. Lister is a good Cambridge name, and in his voluminous works there is not, I believe, a word written in support of the theory of development. Grew was a physiologist of reputation, a Secretary of the Royal Society, and a contemporary of Newton. He published three large works—(1) "On the Comparative Anatomy of the Stomach and Guts." (2) "On the Anatomy of Plants." (3) "*Cosmologia Sacra*, or A Discourse of the Universe, as it is the Creation and Kingdom of God." (4) Also a shorter work, "Tractatus de Salis Cathartici natura et usu." In which of these volumes our Author has found a word in support of his theory of development, is more than I can tell. As for Harvey, his name stands out and shines in the glorious ancestral history of Cambridge, and he must not be passed over without some further notice.

The first question is this: Are the opinions of these four physiologists, either on the fœtal question, or on any hypothesis arising out of it, essentially different from those expressed by Dr. Clark? I believe not. And certain I am that the works of Harvey, if brought into court as evidence, would very little serve our Author's purpose. He has done ill to sport with evidence, and he has shewn how very little he comprehends the severe simplicity which belongs to it. Dr. Clark quoted a remarkable discovery (perfected by three great German anatomists) in illustration of the gradual fœtal development of a Mammal's heart. Harvey also, in his immortal work "*De motu Cordis et Sanguinis in Animalibus*," discussed the structure of a Mammal's heart, and knew the leading facts in the history of its gradual development; but it would be folly to contend that his authority is opposed to the statements of Dr. Clark, because he had not done more than belongs to the powers of one man—because he had not *anticipated* the discoveries made two hundred years afterwards by the concurrent labours of such anatomists as Valentin, Rathké, and Bischoff. I thank, however, our

Author for quoting Harvey's name, as he has thereby induced me to read another work of that great philosopher—his *Exercitationes de Generatione Animalium*—in the hopes of finding some sentence in it bearing on the theory of development.

As to the manner in which vitality is given to the germinal vesicle of the ovum, he entertained some notions which are now generally repudiated by physiologists: and like many of the older naturalists (who were lost among the intricacies of minute observation, and without the powerful help of the modern microscope), he had some ill-defined notions of ambiguous generation. Thus (*Exercitatio* 44) he tells us of insect generation, "*ubi vermis per metamorphosin ex ovo nascitur; vel ex materia putrescente primordia procreantur, à quibus per metamorphosin papilio vel musca oritur,*" &c. On the other hand, describing the pullet's egg, he writes as follows: "*Absque gallina non fit ovum; nec fœcundum evadit sine gallo. Quod opinioni illi adversatur, quæ primum animalium ortum e limo terræ deducit*" (*Exercitatio* 27). Again, speaking of the animal kingdom, he tells us, "*Eodem modo generantur, tam ea, quæ sponte oriri dicuntur, et materiam suam primam, primave exordia à putridine, cœno, rore, excrementis, vel partibus stirpium aut animalium, casu fortuitòve nanciscuntur; quàm illa quæ ex semine animalium proveniunt. Quippe omnibus viventibus id commune est, ut ex semine, seu ovo, originem ducant*" (*Exercitatio* 56).

No one will now maintain the distinction *ex semine seu ovo*, whatever be his opinions on cases of ambiguous generation. But the moment Harvey escaped from phenomena he had not mastered, he expressed himself plainly and emphatically. Thus describing the hatching of a pullet's egg, he says, "*Quomodo scilicet ex mare et fœmina ovum procreetur, et quo pacto ex ovo, gallus et gallina proveniant, istoque circuitu, illorum genus æternitatem, naturæ munere, consequatur*" (*Exercitatio* 12). And, in like manner, though he was perplexed with the generation of insects, and spoke of them as *genus suum minus servantia minusve perpetua*; yet of the higher animals, whether terrestrial or aquatic, he affirms that "*ab univoco principio* (*nempe ab eâdem specie*) *æternitatem consequuntur: hujusque rei causam primam naturæ, et virtuti vegetativæ assignamus*" (*Ex.* 44). It is impossible to affirm the continuity of species in stronger words[*]. Nay, he protests against the idea of progressive development, affirming that the offspring cannot rise above the parent grade—"*non efficientibus suis primis, sive genitoribus, nobilior censeri potest:*" and he describes all this fixed order as springing from the provident wisdom of God—"*providentiâ, sapientiâ item, bonitate, et intellectu, rationalis animæ nostræ captum longe superantibus*" (*Ex.* 49). There is also an admirable passage on the doctrine of a Final Cause in *Exercitatio* 45, which I cannot quote. I have already quoted one passage from *Exercitatio* 55, *De ordine Partium in Generatione.* It is allowed by all authorities to be a wonderful chapter on fœtal development, considering the time when it was written; and, so far from contradicting, it falls in with, and, as far as it goes, confirms the essay on the same subject written two hundred years afterwards by our living Cambridge Professor of Anatomy.

What, then, I may well ask, does our Author gain by summoning the works of Harvey into court? Had he read the works? I have given one quotation which seems to prove that he had at least not read them carefully; and it would be far less to his discredit to have quoted Harvey wantonly and at random, than to have read his works, and then tortured them to give evidence for a theoretical scheme of development.

---

[*] Harvey never finished his investigations on insect generation, nor were his opinions on this subject matured in his published works. His studies were interrupted, and his papers, containing a record of his experiments on this and other parts of comparative anatomy and physiology, were burnt or scattered by a ferocious fanatical mob (to the irreparable loss of British science), at the breaking out of the *civil wars.*

Our Author is enamoured of what the Edinburgh Reviewer calls "the Philosophy of Resemblances;" and so are the neophytes of both the pantheistical schools. A scheme that gives unbridled license to hypothesis, and indulges the fancy in its wildest movements—which deifies man, and tells him to reject all knowledge but what is created by himself, or can be collected organically by himself out of the world of his senses—is flattering to his pride and self-love, and is sure to have its followers. Let us again glance at some of the dogmatical positions of Oken's system. "Man is God wholly manifested" (*Extracts*, supra, p. 225)...."For God to become real, he must appear under the form of a sphere ...God is a rotating globe...The world is God rotating... Without rotation there is no being and no life" (p. 226). "The whole universe is nothing but matter...The universe is a rotating globe of matter...There is no dead matter" (p. 227). "The æther is the first realization of God" (p. 228). "Fire is the totality of æther—is God manifested in his totality" (p. 229). "Life is not different from organism, nor also from galvanism; for life is verily the vital process" (p. 239). "A galvanic pile pounded into atoms must become alive. In this manner Nature brings forth organic bodies" (p. 239). "Light shines upon the water, and it is salted. Light shines upon the salted sea, and it lives" (p. 240) &c. &c. Such are the fundamental propositions of a system. Life begins with infusoria—development does all the rest—and in the end we have man, or "God wholly manifested!" Such a system, considered as philosophy, is not inductive, but insane. It is not merely rank materialism, but rank atheism.

The materialism of the Author of *The Vestiges* is not so horrible as this; because he assumes the being of a God, and accepts many of the great conclusions drawn from our moral and immaterial nature; yet at the same time takes up a fantastical scheme of physical philosophy, which gives us no rational account of the highest and noblest elements of our nature. There are many pages of Oken's work in which I cannot discover a glimmering of common sense. To my mind they have no more sense than we could gather from the whining of an idiot or the bellowing of a madman. Yet, in many insane passages, a kind of spectral light will now and then break out through an atmosphere of mist and moonshine. And sometimes he forgets his materialism, and dreams, even while describing the lower animals, of *circumspection*, and *forethought*, and *sentiment*, and *a spiritual character*, and *a soul in a state of sleep*, and a *spirit brooding unconsciously for years, then breaking forth fearfully in earnestness and strength!* "Gazing upon a Snail (he says, *Physio-philosophy*, p. 657), one believes that he finds the prophesying Goddess sitting upon the tripod...Surely a Snail is an exalted symbol of mind slumbering deeply within itself."

We may gather meaning from the untamed ravings of a lunatic; we may collect lessons of material and moral truth from the wildest wanderings of the fancy; for all these things come from Nature's storehouse; and there *is* a philosophy in all Nature. But Oken's materialism does not reach the threshold of Nature's temple; nor does his soul comprehend the worship due to the Divinity who dwells within it.

Though clothed in a less odious garb, there are passages in *The Vestiges* quite as offensive to common sense as the slimy sentimentality that offends our taste in the last quotation from the *Physio-philosophy*. And no wonder; for both of the authors reject that teaching which tells us of our position in Nature, of the attributes of the God of Nature, and of the homage by which we may worship Him, and do His will. Rank materialism grasps neither man nor God. It is a baseless scheme, engendered in "the limbo large and broad" of a diseased imagination. Though earth-born, it sometimes seems to float in mid-air, neither touching earth nor heaven; yet, like many a madman's dream, it is positive and proud.

I can find, here and there, within *The Vestiges*, something almost to match Oken's Snail—"the exalted symbol of mind slumbering deeply within itself—the prophesying goddess sitting on a tripod!" Both Authors have long sat, slumbered, and dreamed under the *arbor Dianæ*. The Edinburgh Reviewer exhorted our Author to quit his seat; and told him that if he remained there, he might be stricken on the head, and have his cerebral organs shamefully put out of tune, and made to jar against all rules of harmony. The goddess, though chaste, is very mischievous. No divinity of the sky so fickle, and of so many faces:—and her motions are so wandering and inconstant, that they have puzzled and confounded the wisest heads since the days of Newton. But under the *arbor Dianæ* our Author still is sitting; and there it was that he evolved, in solitude, some of the queerest visions of his fantastical philosophy. We may take a passing view of one or two of them.

(1) After Man, the Order of *Primates* takes in Monkeys, Lemurs, Bats, and Sloths; and this Order rests on the Dolphin family. In this family each cerebral hemisphere is made of three lobes, as in Men and Monkeys. "It might be rash," says the cautious Author (*Vestiges*, p. 341), "to found any thing upon ancient accounts of the Dolphin—its familiarity with man, and its helping him in shipwreck—although it is difficult to believe these stories to be altogether without some basis of fact." He must have been napping under Diana's tree, thus to cut short his tale. Why did he not tell us of a man who, while Periander was king of Corinth, came over from Sicily riding cheerily upon a Dolphin's back? There is better historical evidence for this fable than for some others, quite as strange, that are vouched for in the *Vestiges*. But he adds, even while broad awake, "there is no doubt that the Dolphin evinces a predilection for human society, and charms the mariner by the gambols which it performs beside his vessel"—especially (he should have added) while it is catching the flying fishes.

But does not the Shark also shew the strongest internal love of the human family, though our Author thinks it hardly deserving of a place among the Vertebrates?

(2) "He may not be held a very fanciful naturalist who would regard the Megatherium as eager to climb the tree which he could only shake, and thus producing a progeny fitted to do that which was the object of his wishes—or the Rock-nose Whale, which loves to rest its head on rocks beside the beach, as wishful of that mode of life which was at length vouchsafed to a more highly developed descendant. Such too may be found to be the true principle of perfectibility in nature—a continual, though it may be an irregularly shewn tendency, to press on to better and better powers—and indefinite improveableness, which may work as seconds in the individual, or strike hours in the species" (*V.* p. 346). But why does our author thus venture to steal the mantle of Lamarck and the elder transformationists? He had no right to stick their feathers in his plume. They told us that the Elephant rose upon the earth with a short neck—that he gazed unhappily on foliage he could not reach, and so his face was lengthened—that it was afterwards more lengthened till his snout could reach the branches—that his nose became prehensile—that he tugged at the branches with it till it was pulled into a trunk—and that then this feature became as stable as that of any other happy Mammal. But our Megatherium worked another way. She was too heavy in her hinder parts to climb; but nature had given her gigantic strength; so she shook the trees of the old forests and tore them down, and then fed on their branches. But she was weary of this work, and sometimes (as we know) broke her head in doing it. So she wished for some mechanism to spare her all this trouble. Nature heard her prayer, and she brought forth a litter of climbing Sloths; which now disport themselves joyfully in the tree-tops, and spend their lives among the dishes of their ready banquet! We have all heard of the "vanity of human wishes," and

we have all read, in our younger days, the merry tale of the three wishes and the ladle. Wishing, after all, seems to be but a sorry business. But, says our Author, Creation is now "a fact accomplished;" and we have no right "to expect the origination of species to be conspicuously exemplified (after this fashion) in the present day" (*V.* p. 80). We do indeed still hear of the marvellous effects of pregnant longings even in the human species: but they sink into the shade in comparison of the natural progeny of wishes in the days of the Megatherium. The wishes of the Megatherium or the Rock-nose Whale, and the perfectibility of nature which strikes hours in the species, are, after all, I fear, but the jarring sounds of a smitten organ—the cerebral blights of Diana's tree.

(3) "It is singular, (says Dr. Roget) that the Frog, though so low in the scale of vertebrated animals, should bear a striking resemblance to the human conformation in its organs of progressive motion."..."It is the only animal (says the Author of *The Vestiges*) besides man with a calf to its leg." But why stop short in such mere crural resemblances? The Frog is natatorial, and so is Man. The Frog is saltatorial, and so is Man. The Frog makes music in solemn concert, and so does Man. The biggest of all Batrachians, the Labyrinthodon, left *hand-like footsteps* in the New Red Sandstone. "Not for nothing is it that we start at the picture of that strange impression—ghost of anticipated humanity!...In these things the superficial thinker will only see matter of ridicule; a large-hearted and truly devout man, who puts nothing away from him, will, on the contrary, discover in them interesting traces of the ways of God to man, and a deeper breathing of the lesson, that whatever lives is to him kindred" (*V.* p. 344). What is this but another vision under the *arbor Dianæ*—a melancholy phantom of a moon-stricken brain, to be put in the same prison-house of delusions with the Snail philosophy of Oken? We allow all living creatures to be our

kindred because they are the creatures of the God who made us; and we owe to them the duties of kindness and humanity. No truly devout and large-hearted man will rashly and wantonly mar the humblest specimens of the workmanship of God. But we deny our Author's rank materialism, and his bestial genealogy of the human race: nor will we permit him to mock us by adorning his scheme with feelings and words of reverence drawn from a far different view of our relation to the Godhead; or to talk of devotion while he is virtually sapping the only foundations on which pure, rational, uncontaminated moral sentiment is or can be built; and impotently striving to drain, to perfect dryness, the living, heavenly springs of humanity, and piety, and mutual love.

He is confident enough to tell us (p. 344), that he claims for his scheme "the character of being the only approach yet made to a truly natural classification." I discuss not the merits or demerits of his classification. But while he writes historically, he commits nothing short of a literary fraud if he dresses his facts in the language of his hypothesis; and not once, but many times, while he states only what is true, he contrives to insinuate only what is false. The true meaning of the Author's scheme of nature may be read in the honest works of Oken, who blinks and fears no consequences. If our Author knew them not at first he knows them now; and I hesitate not to pronounce his scheme, and his defence of it, as false to all the rules by which Nature may be interpreted—as shallow, demoralizing, and mischievous.

But I beg the reader's pardon; I am only speaking of the Author's dreams; and in truth he is an honest dreamer. Many a time during past years (while the Chimpanzee was living) have I wished for some clew to guide me to his hiding-place, that I might have the comic happiness of drawing him from the shade of Diana's tree, and going with him to the Zoological Garden of London, there to witness the emotions of his filial love while he was gazing on the solemn visage of one in the very type of his immediate ancestors. "Not for nothing would he have started" at that perfect image of "anticipated humanity!"

(4) Speaking of the *Primates*, he tells us, "that sociality, vocality, a prehensive use of the extremities, imaginativeness, drollery, sagacity, all form characteristics generally applicable to this line of animals"..."In the mammalian stage they suddenly ascend to pre-eminence; not by superior strength, but by greater relative magnitude of brain, by agility, and by the use of the hand. The signal superiority of the human species is thus prepared for and betokened in the immediately preceding portions of the line. It might have been seen, ere man existed, that a remarkable creature was coming upon the earth" (*V.* p. 355). Again, the *arbor Dianæ*: but the Snail of Oken sitting on a tripod gives us an oracular vision of the future just as clear as this. To be *quite* sure, however, in cases of prediction, let me, above all things, have a judgment upon them after the event.

(5) "Verily, it would give us a curious conception of organic nature if we could satisfy ourselves that, like chemistry, it had a mysterious foundation in mathematical proportions. Threes under threes, each subordinate three reflecting the trinity to which it belongs, and all others! Such an idea is obviously favourable to the development-theory; as arguing a unity in animated nature, and the definite character of its entire constitution....the Natural appears to sink into and merge in a higher Artificial" (*V.* p. 350). I object not to the latter part of this extract, for I believe it true. No one denies a unity of plan in nature: but on that great truth rests not the theory of development. The first sentence belongs not to Diana's outer grove; but rather to the visions of a brain that has been blighted before the altar of her sanctuary. Many a sentence like this, and far worse than this, may be found in Oken's Philosophy.

But I wish again to come to plain matters of fact, and to honest reasons drawn from them.

Our Author, as we have seen, contends "that his Material scheme may be true, though one half the illustrations presented by its first explanation should be wrong" (*supra*, p. cli.) True! for a man may argue ill, though his principles be right. The positive facts bearing on the question have been discussed at sufficient length in the Preface, and in this Note: but are there any reasons *à priori* why we should accept the material hypothesis? Let me here endeavour to examine these pretended reasons, some of which have been but little noticed in the Preface.

(1) He affirms that the distinction of Species is purely arbitrary. I believe that this is not true. It is not the opinion of our best naturalists; and of whom, if not from them, are we to learn the truth? Again, on his system, not only is a change from Species to Species, but from Class to Class, to be called "a simply natural procedure." We reply, that such changes are contrary to all experience; and therefore we can make no true induction from their assertion: and if we describe our hypothetical conclusions in the words of exact inductive philosophy, we thereby put a cheat upon our readers.

(2) He next contends that *if* the origination, not of Species only, but of Orders and Classes, came under our congnizance, it would prove to be a natural process. I think this not merely true, but very like a truism: for if we had cognizance of such a process it could only be by natural means; unless, indeed, we admitted, and believed in (which no one pretends to do), a special revelation of physical phenomena. (*E.* p. 141.)

(3) When he states that in such cases of organic progress "general considerations," conducted in a scientific spirit, throw the balance of likelihood on the side of ordinary natural causes" (*V.* p. 154), I think the assertion

inexact and erroneous; for even admitting, for sake of argument, that such changes were wrought by second causes; still they were not wrought by *ordinary* natural causes; but by *extraordinary* causes, such as have not been ever submitted to the reason and senses of man. They belong not, therefore, to the province of inductive science. In the present condition of our knowledge they belong not to second causes; and if we describe them at all with reference to Cause, we have only the First Cause to look up to; and (as before stated) we are logically exact when we describe their origin by the word *creation*.

(4) He constantly describes his system as a scheme of universal law and order, and seems to claim for it on that account a great *à priori* merit; while he denounces all other views of nature as superstitious and miraculous. He tells us that we put nature under a Bœotian rule, and explain her mysteries by the fraud and trick of special miracles and miraculous creations, &c. We use no such language. A Pantheist or rank Materialist may attribute such language to us; but we use it not; though we do believe in miracles, and believe that, in a certain sense, all nature is miraculous: meaning, thereby, that there is a God of nature, and that his creative secrets are above our ken, and out of the narrow limits of our knowledge. If we admit a First Cause, why banish Him from his own works of nature, and deny His continued control over his own ministering subjects? We utterly repudiate that gross material conception (formerly put forth against us by the Author of *The Vestiges*), that would represent Him as a Being travelling from place to place to regulate the provinces of His kingdom. In one sense we are Pantheists—we believe in His ubiquity—a personal, creative, and sustaining ubiquity. This very doctrine seems to be admitted by our Author: and if it be admitted, why not lean upon it when our speculations stretch beyond the limits of our material knowledge? Within the limits of our knowledge we reason only of

second causes; for they are the ministering implements by which God communicates with us, and by which we learn what are his material laws; and we have no other or better way of learning and understanding what these laws are. We believe then in universal law and order extending through the whole known domain of nature: but as to creation, and the commencement of laws, we dare not dogmatize beyond our knowledge: and, in all such speculations, we think ourselves not only more consistent in our verbal logic, but more rational and philosophical, by acknowledging our ignorance and looking up to the First Cause, than we should be, were we to dare (like our Materialists) to break, in imagination, into inaccessible provinces of nature and there profanely pretend to do God's work, by contriving laws, for his unknown kingdoms, which he has in no way condescended to reveal to us.

In doing what we dare not do, our Author is at once illogical and inconsistent. A material Pantheist would, indeed, be consistent; but our Author professes to believe in a great personal First Cause. Oken tells us "that life is not different from organism...that fire is God manifested in His totality...and that Man is God wholly manifested," &c. &c. Just as well might he tell us that man differs not from the implements made by his hands—that a steam-engine is man wholly manifested—or that a cotton-mill implies no contriving cause, no mind exterior to itself. But Oken's material Pantheism, and the blasphemous fooleries he has contrived to string upon it, have their antidote in such extracts as are printed in Note VIII. The inconsistent logic and rank Materialism of *The Vestiges* have a more subtle and concealed mischief; yet is their end the same, and they lead us to no moral consequences of a better nature than might be drawn from Oken's Pantheism.

(5) It is now generally admitted, as a fundamental principle in sound physical reasoning, that inductive evidence has nothing to do with the commencement of natural laws.

It deals only with established laws and the phenomena arising out of them. But if the organic world be now governed by law, can we believe, says our Author, that it began without law? I reply, No! It began in obedience to a creative law—the emanation of the Divine Mind: but this is no question of physics. Surely, says our Author, if our faculties cannot comprehend such a physical point as this, "they must be equally unable to pronounce decisively upon points so abstruse as law being subordinate to will, and the attributes of that will shewing us the Deity as a personal and superintending God" (*E.* p. 137). This is a question of mental philosophy I cannot here discuss at any length. I may, however, affirm (what our Author cannot consistently deny), that we can prove, from the light of Nature, the existence of a personal God and Creator, and, by a study of His works, make some approach towards a conception of His attributes: but we have no power to penetrate the secrets of His will, or to tell why, at any moment in the past history of the Universe, he exercised or withheld his creative energy. Every turn of our Author's reasoning shews us how closely his scheme verges on material Pantheism. When he affirms that the system of Nature is carried on by natural laws, and therefore began by natural laws, he uses very slippery language; for *natural* law has two distinct meanings in this proposition. In the former sense it is the proper subject of true inductive reasoning, in the latter it is not. Oken, indeed, makes no difference between the two; for on his material scheme every instance of new life is a new creation. But our Author repudiates Oken's material Pantheism; and with what consistency is no question here. I admit, in all its fulness, a sentiment which follows the last quotation: "No truth can be derogatory to the presumed fountain of all truth;" and he, I contend, is practically an infidel who dreads the publication of any general truth of Nature, or any conclusion fairly drawn from it. Our objection to the Author's rank Materialism is this: viz. that it is *not based on the facts of*

Nature, or upon a good interpretation of her laws—that it is not worked out as the consequence of any fair induction—that it is shallow and pantheistical—and mischievous because untrue.

(6) "The most rigid disproof (he tells us) of primitive creation, as a fact of our time, could be no conclusive argument against a natural creation at a time the earth was vacant of all organic tenantry, *if* for such a creation any positive arguments can be adduced" (*V.* p. 181). This sentence is conditional; but how are we to find a positive argument bearing on the *first creation* of organic life? The *condition* involves a perfect *impossibility*, and therefore the remark is worthless. Again he contends, in the page preceding, "that the work (of creation) being to all appearance finished, we are not necessarily to *expect* that the origination of life and of species should be *conspicuously exemplified in the present day.*" Let us admit this, and suppose (for argument's sake) that Nature has *almost exhausted* her powers of producing new animal combinations. Where then should we expect to find her powers not yet quite exhausted? Surely, it must be among the Mammal tribes; for Nature has been working on them but a comparatively short time; and indeed (*speaking geologically*) she began this part of her task of creation or transmutation but yesterday. But we find, as a matter of fact, no Mammal creations or transmutations going on now; and the only places where any one pretends to look for transmutations, are the dark and obscure corners of the earth, and among phenomena so minute as to escape the unassisted senses.

(7) The last and most plausible argument *à priori* for the creation of the organic kingdoms by natural law, may be stated in a few words as follows. Material laws are constant, and all combinations of matter, not organic, have arisen, through the undeviating operation of these laws, out of the anterior combinations of matter. This we generally admit as true, whatever may be our views as to the primeval

condition of the matter which now forms the Earth: and, figuratively speaking, we may say, that within this condition lurked the germ of every material combination, or mechanical arrangement, which took place afterwards. I have discussed this conception in the preceding Discourse (p. 28), and contended that it does not by any means invalidate the doctrine of a Final Cause. Now organic nature is interwoven with the inorganic, and cannot exist without it. May we not then believe that all organic bodies (from a Monad to a Man) have arisen naturally, and necessarily out of constant material laws, co-ordinate with, and truly forming a part of, the laws of dead and inorganic matter? I have put this question in my own words: but I have endeavoured to put it fairly. On this question I offer the following comment.

One who has adopted a scheme of rank Materialism will probably give a positive reply to this question. But one who believes that sensation, volition, invention, thought, are things entirely different from dead matter;—who knows, from personal consciousness, that there is a connecting principle, through which all his sensations are bound together in personal self;—who knows, by the same consciousness, (*which makes himself to himself*), that there are indwelling principles and abstract intellectual powers, making up that unity of individual mind or soul he calls self, and of which conception (the substratum of all his faculties) he cannot divest himself:—who knows, moreover, that without these concatenated in-dwelling powers (call them by what name we will) there could neither be *personal sensation*, nor knowledge of any single property of dead matter, or of any material law organic or inorganic:—such a one will never hesitate in his reply, and will answer the question by a negative. And, perhaps, he would add, that of his living soul he has direct knowledge from consciousness; but of the outer world he has only a knowledge of inference; and that he cannot make his material inferences, respecting the outer world, the substratum of that soul which he knows by a consciousness that was within him before he knew the outer world.

I believe that in this very question lurks the true history of the *Vestiges of Creation*. The tinkling bells of phrenology had jarred among our Author's finer senses, and spite of his right conception of a great First Cause ordaining law and sustaining nature (and if he confounds cause and effect, deprives God of his personality, and resolves our conception of Him into a mere conception of His material manifestations, our Author is then a rank material Pantheist, which he denies), he became, as we have seen, an uncompromising Materialist. The historical facts of Geology gave him, he thought, a key-note in a harmonious scheme of development. He therefore began his history of organic nature, with very meagre knowledge, but with an unwavering belief that he could cull from it something that would give consistency to the creature of his first affections—his adopted phrenological Materialism. His mind was not made up from a study of the old remains of organic life; but it was made up from some form of *à priori* evidence (no matter whether good or bad) before he began this study. His material scheme was not, therefore, deduced from the facts of Geology; but the facts of Geology were fitted to his material scheme. No wonder, then, that he should grievously blunder both in the description and the interpretation of facts which were new to him: and no wonder that, afterwards, when put right on questions of fact, he should affirm such facts to be of little consequence, and persist in an interpretation of Nature which, from the very first, was not built upon them. But the glaring fault of his work, and what makes it false to Nature and intensely mischievous, is his continuing to misrepresent the facts of Geology, and to tell his readers that it is an illustration and a proof of his Materialism. We tell him, on the widest evidence of facts, that, whatever may be the merits or demerits of his Materialism, Geology lends it no support, but throws a series of very formidable, and we believe impassable, barriers across its path.

But to return to the previous question. It may be contended, that we have no right (while discussing Materialism) to go at once to the extreme organic case of Man—that we should take into our view all organic nature, from the lowest to the highest forms of animal life. But if the material scheme be true, it must include the highest earthly being, Man; and extreme cases are often the very *experimenta crucis* of an hypothesis. Leaving this case, however, we contend that there is an essential difference between organic and inorganic Nature, that they are governed by different laws, and that the same material reasoning cannot be applied to both. Material laws appear to have been ordained long before the organic, and never to have changed since. The crystalline combinations in the oldest rocks are the results of definite chemical combinations exactly as in the newest: and many of the combinations we can imitate in a laboratory. They do not emanate from geographical centers, but are the obvious results of material laws affecting the whole earth. The igneous minerals of New Holland are essentially the same with the igneous minerals of Iceland. In like manner the mechanical disturbing forces of all periods appear to have been the same in kind, however differing in intensity; as, indeed, they differ now within the narrow periods of actual observation.

On the contrary, when we come to organic nature, the obvious laws appear to be widely different. They have reference to individual life—they have a defined *purpose*—they are carried on in cycles involving that *purpose*. Each Species is a microcosm governed by its own laws; and the commencement of a new Species is the commencement of a new system of law. The Species emanate from geographical centers, and are continued, and distributed over wide spaces, by organic contrivances and laws which have not the remotest similitude to the successive combinations of dead matter, or its mechanical transit over the surface of the earth. Indigenous species (*e.g.*) in Iceland all differ from indigenous species in New Holland: and not only have organic laws a reference to life and volition and the functions of an individual; but, lastly, they are bound up with moral and intellectual phenomena; for in speaking of organic laws Man cannot be separated from the other parts of organic nature. We have therefore, *in limine*, very good reasons for not confounding the simple laws of dead matter with the multitudinous cycles of organic law. The former can go on without the latter: the latter cannot go on without the former; but they are not (so far as we know anything of law, or have any knowledge of the actual surface of the earth) the natural and necessary consequence of the former. Laws, whether organic or inorganic, have an ordaining cause, and they work together in harmony, because they have a common origin in the will of the great First Cause. In this belief a Theist rests content. A Pantheist has another creed; and let the reader look at its abominable reflexion in the extracts from Oken.

A Theist cannot be a consistent Materialist without damaging his principles, and ending in conclusions that verge on Pantheism. Thus when our Author tells us "that he cannot separate nature from God himself," (*E.* p. 171), whatever be his meaning, he uses the language of a Pantheist. We do not separate nature from God as its Creator and providential Governor: but our conception of a personal God *is separate* from what we call nature. We believe that He existed before all worlds, and that the world of sense makes no part of His personality; though it be through the world of sense that He has deigned, in part, to make himself known to us; and we might call it, figuratively, the voice or expression of His will addressed to our natural senses.

Again, our Author admits with us "the whole doctrine of the divine authorship of organic nature" (*V.* p. 157).

Yet when we, on questions above the reach of inductive experience, look up to that authorship and tell of the creative power of God; he, on these questions, pretends to see beyond Nature—tells us of laws out of the known course of Nature—and evolves all the phenomena of creation, dead or living, out of a long series of hypothetical causes of his mere invention. This is not, we think, to honour, but to insult the God of nature; and so far as physical truth is concerned, this hypothetical extravagance is not the way of advancing truth; because it turns the thoughts away from that humble experimental search after the highest accessible secrets of Nature which, since Galileo's days, has been so fruitful in good discoveries. We admit causation in its widest sense; and when we speak of creation, we, in the first place, speak of a fact of Nature, and then we infer a cause; and as the mode of creative causation, whereby new laws of phenomena first began, is removed from the bounds of our experience, we refer, as stated above, to the great First Cause, whenever we speak of such phenomena. Our Author, on the contrary, admits the existence of a First Cause; but allows us neither a physical nor a moral use of such a conception. The First Cause is not allowed either to exercise a providential government, or to communicate with His intellectual and moral creatures by any other than the material laws of dead nature. I see no meaning in such a limitation. It strikes at the root of moral and religious truth, and, to be consistent, merges into material Pantheism.

While arguing against any admission of a creative energy in the historical progress of organic life, he has told us that we anthropomorphize God—that we describe him as a being who travels, it may be, from one planet to another—"and deals with the world as a human being deals with his own affairs." Who ever but a Pantheist could thus misrepresent our conceptions of the Godhead, and invent such language? It is the kind of argument we should perhaps expect from

Oken: it is the language of a man who cannot separate material nature from a personal God—who makes Nature into God, and God into Nature.

Again, when he tells us (*E.* p. 185) that in his material scheme "the Deity Himself becomes a defined, instead of a capricious being," he writes in the language of Pantheism. Because we hold that God is a providential governor of the world, we hold Him not, on that account, as a capricious being. And if there be, to our uninstructed sense, any apparent jar in Nature's movements, or any apparent conflict among her laws, we lessen not this jar and conflict by daring to remove the Godhead from His works, and to "invest Him with a character of tranquillity altogether new:" neither dare we to define or pretend to comprehend the whole attributes of His Divinity.

"Nature is God, and God is Nature...Man is God wholly manifested...We no longer pursue the *ignes fatui* of the mind...Man expresses the ultimate goal and purpose of Nature's design" (Oken). Here we have plain, honest, unmasked Pantheism. God is strictly defined and bounded. He is nothing but Nature—Nature as grasped by the powers of man. We, on the contrary, believe not in a defined Divinity. Our knowledge of the Godhead is indeed defined by the limits of our comprehension; but not so our belief. We believe in an infinity beyond the ken of sense and the grasp of thought; and over that infinity we believe that there presides a present, personal, creative, and providential God. But our Author is not a Pantheist. He has listened to a better teaching, and he has the moral benefit of inconsistency, and of discarding from his soul's faith that very limitation and definition of the First Cause to which his Materialism points, and which a Pantheist accepts without reserve.

But he accuses us of "intellectual timidity"—of a "barren philosophy"—of a "deficiency in the life and soul of Nature-seeking" (*E.* p. 177). If it be timidity to listen to the voice of Nature, and to regulate our scientific faith by her teaching — to found our knowledge upon observation and experiment, and by their test to try and guide our efforts in exploring the laws, and enlarging the bounds, of physical truth; — then we plead guilty to the charge of cowardice: and we are far too humble and cowardly to lay down the law for God in provinces within which we have not trodden, and wherein He has not unfolded to our senses or our reason by what laws he has thought fit to govern the creatures of His hand. Neither are we so proud and self-satisfied as to shut our eyes against any other and higher illumination, should the God of Nature condescend to give it us. We do allow that, by itself, material philosophy is barren: and "when the awakened and craving soul asks what science can do for us in explaining the great ends of the Author of our Nature, and our relations to Him, to good and evil, to life and to eternity" (*E.* p. 178); we reply, that science does, at least, tell us one thing—that there is a God of Nature—that moralists admit this truth—that its acceptance is the foundation of social happiness and order—and that all Nature, material as well as moral, is utterly sterile and unmeaning without it. But this is not all; and were no more knowledge given us, small would be our strength in our hours of need, and small our hopes of future good. A higher illumination is in store for us, to enlighten the most dismal paths in the way of life—a light emanating from the Fountain of all light, irradiating and sanctifying the soul of man—satisfying his cravings here—silencing the dissonant jars of an impotent philosophy, and bringing all Nature into harmony. Here we may light our lamps, and see the way in which we must walk while we do our Maker's will; and by this light we can even pierce through the darkness of futurity, and see, in faith and hope, the blessings that are laid up for those who live a life of purity and mutual love. But our Author tells us (what we emphatically deny) that when the craving soul asks what science can do for us, we stop short among shells, and skeletons, and machines, and chemical retorts. It is he, and Materialists like himself, that stop short among dead material things, and can reach no higher aim than such dead things can teach them.

As, however, he has rejected Pantheism—the rightful progeny of Materialism—let us do him justice, by marking the moral elevation to which he can soar, with the dead weight of Materialism pressing on his wings. Some of his fundamental propositions are as follows:—"Grades of mind, like the forms of being, are mere stages of development."... "The few gleams of reason, which we see in the lower animals, are precisely analogous to such a development of the fore-arm as we see in a whale" (*V*. p. 433.)...Causality, veneration, reason, conscientiousness, are all organic. ..."Freewill is but a supremacy of one organ over another."..."The person emphatically called a wicked Man is one whose higher moral feelings are (organically) rudimental."..."Cuvier and Newton are but the expansions of a clown."..."There are clever dogs and clever horses," &c. (*V*. p. 437). I merely pause to remark on the perfect Materialism of all these statements. No distinction is drawn between the organs, as the instruments through which the mind perceives or manifests its reflective powers, and the mind itself. In what then (if this be all) does Phrenology differ from Pantheism? The Pantheist makes not the world (organic and inorganic) the manifestation of the power and will of God, but God himself. So also the Materialist, though he speaks of causality, virtually extinguishes its power and meaning, by confounding the organic functions of Man with his personal self. I am not arguing now against the system of Phrenology, but speaking of its obvious consequences in our Author's representation of it. It professes to be inductive; and even admitting that there is a show of truth in some of its first principles, it is, both in its organic details and their application, the very flimsiest system of induction that ever became current in society. It has sometimes damaged taste by dressing up moral or descriptive writing in an abominable jargon. It has damaged art: for some of our artists are phrenologists; and they learn so to represent the human countenance that their portraits are the distorted reflexions of an hypothesis; and not, what they ought to be, a true but idealized copy of something which came from God and was stamped in His image. Worse still, it has been the school of material Pantheism, and has thereby done deadly mischief to the moral sentiments and hopes of thousands. And how can it be otherwise, if men are to be instructed—that there is no difference between material and moral—that we are the progeny of brutes—and that the mind of man (or his "psychological constitution," for a materialist denies that he has a soul—making it nothing but a bundle of material organs) "is developed from inherent qualities, and has a mode of action depending *solely* on its own organization?" (*V.* p. 445). Our Author draws no distinction whatsoever between the individual soul (or self), and the implements whereby it manifests its powers and capacities. Whatever be his faith, his teaching is therefore Pantheistical. Life, says Oken, is vital function—God is nature. Thought, says our Author, is organic. In what these two Authors differ fundamentally, I cannot discover. One rejects what most men will think the legitimate progeny of Materialism; for he speaks of a First Cause as something different from His manifestations of Himself. Oken blinks at nothing, and follows out his Materialism without flinching. In his scheme we do see the true moral reflexion of Materialism. But our Author tells us "that the face of God is reflected in the organization of man, as a little pool reflects the glorious sun" (*V.* p. 435). We tell him that the soul of man is the reflecting surface, and that the material organs do not reflect at all. The Edinburgh Reviewer told him, most truly, "that many a shallow pool will reflect the images of the sky, but if we stoop down to drink it we only fill our mouths with nastiness." Oken is sublimely transcendental: and our Author sometimes, also, makes his transcendental flights; for he appears to see, in a kind of prophetic anticipation, everything inorganic resolved into GRAVITATION, and everything else into DEVELOPMENT (*V.* p. 445). There is nothing beyond this in the transcendentalism of Oken: and are we to call it a new and higher flight in the way of moral and material knowledge than men had made before? It is the veriest chaff, without one grain of food within it.

But we must follow him a little farther, that we may see how he professes to draw new hopes and consolations out of his Materialism. But are they new? Do they rest on a better sanction than they did before? Has he made any advance in our moral knowledge? He tells us, what we knew well before, that God works by general and fixed laws,—"an arrangement (he adds) which admits only of the main and primary results being good, but disregards exceptions." If we affirm that God's laws only admit of this or that, we affirm something far above our knowledge: and if we affirm that God disregards exceptions, we are very rash and irreverent. That laws are fixed, and that God is prescient, we believe true. Yet we also know that we have that moral freedom which makes us responsible, and that we can so work upon the material laws of God as to turn them to our purpose. Herein consists our responsibility. We believe then that the moral acts of men are bound up with, and form a part of, the second causes whereby a prescient God works out the purposes of His will. Practically our knowledge is sufficient for our guidance. Speculatively it solves not, and I think never will, the knotty question of God's fore-knowledge and man's responsibility, and how His attributes co-exist with that degree of freedom without which responsibility would have no meaning. Has our Author's Materialism solved this long-agitated question? It has cut the Gordian knot by a scheme of material fatalism (not far different indeed in result from one adopted by some good and religious men) which has no logical consistency with our conceptions of the moral acts of human choice, and moral responsibility.

The existence of evil is the gravest and most difficult of moral questions, and is not to be treated rashly or irreverently. On this subject there are some good remarks in the *Vestiges* (p. 447—470), where our Author discusses, in a good moral spirit, some of the evils that are woven into the constitution of society: but so far as his remarks are good, they are not new; and they are, here and there, tinged with a suffusion of his Materialism. When he tells us that physical laws produce undeviating results upon dead matter, we all agree with him: but when he adds that moral laws (allowing for their wider range of action) are equally undeviating in their results; and "that the two sets of laws are independent of each other" (*V.* p. 463), he expresses two conclusions; the former of which very few would admit without some further limitation; and the latter (whether true or false) is in palpable contradiction to some other expressions of his published works.

That evil exists we know full well: and the great practical question is this:—How are we to conduct ourselves, so as to palliate these evils in a way that is compatible with the laws of God? Our Author tells us, by way of reply to this question, that we must "study with all care the constitution of nature and accommodate ourselves to that constitution, so as to gain all possible advantages from it, and avoid all evils likely to arise from it" (*V.* p. 471). This is common prudence, and nothing else. The same advice, in different words, has been given a thousand times before, both by Heathen and Christian moralists. So far as it goes it is good: but what higher sanction has it, in our Author's scheme, than it had before? Again he tells us (*V.* p. 174), that there is a higher moral law, "which has long been announced, but never acted on to a considerable extent, that our greatest happiness is not to be realized by each having a regard to himself, but by each seeking primarily to benefit his fellow-creatures." This is a glorious law, which finds its response in the reason and social affections of our inner nature, and its sanction in the commands of God. To say that it has "never been acted on to a considerable extent" is the reverse of what is true. To say that it has never been acted on as it ought to be, is, alas! but too true. It had its divine illustration in the person of the Son of God. It had its human illustration in the labours of love whereby Christianity was planted in the world; and it has its illustration still, in the self-denying love of tens of thousands of Christians, and in the laws and social institutions of Christendom. So that however base and selfish men and nations may be in fact and deed; in word and outward show, at least, they do profess obedience to this law; and recognize its sanction, both in the moral constitution of man, and in the rule of life given them by the Word of God. Our Author has indeed soared at length, on his material wings, to the sight of a heavenly rule, that was engraven on the tablets of his heart—that was proclaimed in the sky by the messengers of God—that may be read in the Book of Life, the enduring record of our Father's love.

Religion gives a sanction for the Author's "higher law:" but what sanction and what hopes of practical obedience to this law does Materialism offer us? He must tell us in his own words: "When man comes to have confidence in his own nature, he will act on this principle (viz. of seeking primarily to benefit his fellow-creatures), and the result will be a degree of happiness such as we only see at present faintly shadowed forth in the purest and sweetest charities of family life!" And is this all that our Author's cold philosophy can teach us? Is it for this that we are to cast away our belief in God, as our Creator, Redeemer, and Sanctifier? Is this all that either Materialism or Pantheism has in store for us? Man is to have confidence in his own nature! He wants not confidence in his nature: he has more than enough of this element already. What he wants above all is humility and brotherly love. A brutal pedigree will not instruct him in the sweet charities of life. A material fatalism will not guide him towards them—a pantheistic deification of his person will not make him kind and humble.

But our Author has not yet stayed his flight. There is another hope for us in reserve. Knowledge is advancing, and the arts of life are improving. "The advance of knowledge favours the progress of moral conditions, and in improved moral conditions knowledge becomes more sound" (*V*. p. 475). True! and all men have hopes of some moral progress and improvement in the human family. But how to bring this about is the great social problem. Let us but hear our Author. "The improvements partly wrought out by the present race, I conceive at once preparations for, and causes of, the *possible development of higher types of humanity*..... beings more fitted for the delights of social life, because society will then present less to dread and more to love" (p. 476). I have heard it said, in jest, that man's capacity of belief is like an inflated bladder. If compressed on one side, it swells and stretches on another. Truth may be told in jest: for our Author's capacity of belief on some sides has undergone a most horrible constriction; but on others it swells till it bursts the filaments of common sense, and rises almost above the stretch of fancy. Poor hopes have we, in such dreaming, of future good for the human race! Organic perfectibility was talked of as a law of nature about sixty years since by some French Philosophers: but they were not content with talking; and we know (and Europe still feels in every corner of her social system) what followed the practical promulgation of this and other kindred laws developed among the dreams of infidel Materialism. So we are, it seems, to throw aside our hopes in the promises of God—we are to call men dreamers and Bœotian blockheads who trust in any teaching that springs not from material development:

and as for the future, we are to look for higher types of humanity! This is our Author's darling absurdity. It is the precious fruit of Diana's tree that has showered abundantly on his head. Oken has nothing more rampantly absurd than this. It is rank Materialism run raving mad; and even if accepted as prophetic (like the mad ravings on some old heathen tripod), it would offer no personal comfort to us; nor could it be operative in making a single man wiser, or humbler, or more charitable.

But is there nothing better in reserve, and no higher flight of Materialism? Are worldly prudence and confidence in ourselves to be our only great guiding principles in this life of trial and temptation? Are we to be kind to the brute creation for no better reason than because we have a bestial pedigree? Are we to be kind to our fellow-creatures, and to seek their good while we seek our own, on no higher rule than one we derive from "a careful study of the (physical) constitution of matter," and a well-considered attempt "to accommodate ourselves to that constitution?" Yes! there is something else behind. "We may (says our Author) still feel that God is the immediate breather of our life, and the Ruler of our spirits; that we may, by a rightly directed thought, come into communion with Him, and feel that, even when His penal ordinances are enforced upon us, His hand and arm are closely about us" (*V.* p. 478). Nor is this all. *It may be* "that there is a system of Mercy and Grace behind the screen of nature"... "that the present system is but a stage in a Great Progress, and that Redress is in reserve."..."Our system (he adds), though it may at first appear at issue with other doctrines in esteem among mankind, tends to come into harmony with them, and even to give them support."...Lastly (he tells us), that if arguments such as these fail of their effect, there still may be a faith derived from his material scheme of nature "sufficient to sustain us under all sense of the imperfect happiness, the calamities, the woes, and pains of this sphere of being: and that in such a faith we may well rest at ease." (Conclusion of *The Vestiges.*)

If hopes such as these are to be drawn only from the study of our place in material nature, they resolve themselves partly into mere heathen stoicism, and they rise not one jot above it; or they may lean on the less elevated maxims of worldly prudence. But they savour of another teaching, and they are dressed in words not found among the maxims of worldly prudence or stoical indifference: and if our Author believed them genuine, or had seen even the feeblest glimmering of their truth, was he right in taking up, and publishing, a baseless and preposterous material hypothesis? —an hypothesis which, avowedly, banishes God from any providential government of the world—repudiates, and scoffs at, any teaching, except such as springs by physical necessity out of a universal scheme of Materialism—a scheme which makes religion but a fable, religious teachers but a band of cheats, and a petition sent up to God in prayer but a blind and ignorant effort to reverse or tamper with the unchangeable laws of matter. Of this, at least, I am certain, that the circulation of *The Vestiges* has done much moral mischief; and has taught, even some well-educated professional men to think, that they now know their place in nature better than they did before—that they have no need to pray to God in famine, plague, or sickness, or by any effort of religious exercise to ask for a diminution of a physical evil.

We also believe in the constancy of material laws: yet we know that the living, intellectual, and moral part of our nature can act on the material, so as to modify it to a social and useful purpose. We believe also in the ubiquity and providence of God; and believing this, we cannot doubt that in His prescient mind the voluntary acts of men are as the second causes whereby He works out the purposes of His omnipotent will. Why then should we doubt or hesitate to do that which religion teaches and nature prompts—to offer petitions to God in prayer?—hoping thereby to abate, it may be, a physical evil, or to amend our moral condition?

Our Author has published a work which, in principle, is opposed both to the inductive logic of material philosophy, and to the faith and moral hopes of his countrymen: and he has striven to circulate his poison, not merely among men of science, by whom his scheme has been righteously judged and condemned; but among men who, from their information and previous habits of thought on physical questions, had no ready antidote against his delusive teaching.

We have now watched every material flight that he has made toward a conception of the higher moral truths of nature—his impotent efforts to mount to the hidden secrets of the Deity on waxen wings of sense which cannot bear the sun of truth to shine upon them. He tells us not of light, but of "darkness that may be felt." He comes down again to the earth, and has brought with him no rule of guidance or heavenly sanction from the sky: but he still flounders in the mire of his Materialism, where the reasonable hopes of future good can neither dwell, nor find, for one moment, any solid ground whereon to rest.

Nor does the moral mischief end here. Infidelity was at one time metaphysical, and led either to Scepticism or Deism: now it is gross and material, and ends in material Pantheism or Atheism. If we can believe that the whole system of nature we see before us—organic, inorganic, physical and moral—is the mere product of nature's material mechanism; it follows that our conceptions of cause, time and eternity, and moral right or wrong, are also the mere product of material mechanism. Why then (may say the Pantheist) any need to suppose a causation different from Nature, seeing that Nature herself works out causation? I am not going to discuss a logical question between a deistical Materialist and a material Pantheist. I merely point to consequences which, notoriously, some great physiologists have accepted as physical truths. So far as our Author is concerned, I have argued honestly against his *System of Nature*, only by an inductive appeal to Nature. But I had also a moral right to point to its moral consequences: for he himself, from the very first, drew moral consequences from it. The moral objections, taken by themselves, are no disproof of our Author's physical system: but to state them, may be very right and useful, as a caution; lest some person, not well informed, should be ready to swallow our Author's universal nostrum, without knowing that there is a deadly poison lurking in it.

I think, as I have said before, that the University of Cambridge has little to fear from material Pantheism, and nothing from a clever and plausible, but very shallow work like *The Vestiges*, which I will now dismiss from my thoughts. But we have something to fear from ideal Pantheism, and we have something also to fear from a want of Catholicity in the studies of our Sons. To gain any of the higher Academic prizes, we have to concentrate our strength on some one leading object. This is certain, and it is by no means a necessary evil; for nothing is worse for the growing mind than a superficial diffusion over too wide a base of study. But our concentration should be on something that is great and good, and should never be exclusive. A mathematician may be sterile in the general knowledge that should adorn every English gentleman; and a great classical scholar may be shamefully ignorant of the laws of Nature, and the first elements of Physics. These cases are, I believe, far less common than they were in former times. On looking back upon the earlier parts of this Volume, I have met with an expression which requires explanation and, perhaps, apology. I have stated that "evil would be the day to the University, were she to decorate with her best honours men who continue but accomplished schoolboys" (*supra*, p. cccxlii). When I wrote these words, I had in my mind the ideal (and now, I trust, the very rare) case of a man who entered College after an admirable classical training under some good master—who went on in the same track without any deviation, till he was skilled, above his fellows, in the analysis of the dead languages, and perhaps capable of writing them with critical purity; and who finally carried off the higher honours of the University by these accomplishments, to the absolute exclusion of any other subject of academic teaching. Such persons there have been, and excellent men they were of their kind; but they have very seldom been productive labourers in extending the bounds of human learning; and our present Academic scheme has a larger grasp, and will, we trust, be hereafter more productive of good labourers in the wide and philosophical applications of classical learning.

Again, a man may be great in academic learning with very little knowledge of the history and literature of his religion, and with no knowledge whatsoever of its exalting influence on the heart. He may be a learned Theologian while he is in heart a Sceptic. He may be lax in his notions of church-government; or he may be the very slave of authority, and an idolater of forms and non-essentials. And he may be all this, while he is himself a doubter and a waverer; and at the same time a dogmatist and a persecutor. The great point at which we ought to labour, should be to give a Catholicity to our system of instruction, so far as this may be compatible with some great dominant objects of study to which the youthful mind should be directed and encouraged, by liberal academic teaching and by public rewards.

If a student have contracted habits of inveterate sensuality, even rank Materialism may have some seductions for him in his weary hours of diseased speculation; but we dread not this, and I am not dealing with exceptional cases. But the religion he professes may hang very lightly upon him; and he may be, in heart, nothing better than a doubter or a Deist. In such a state, if he be a man of speculation, he may, while he is seeking to satiate his imagination and his soul's longings, easily pass into a dreaming ideal Pantheist. Or, if his mind be not of a metaphysical cast, he may, perhaps, accept a kind of mental Epicureanism—an ideal scheme which ends in teaching him to look for the supreme good in that worldly happiness he can draw from a free, unbridled exercise of his intellect and imagination. Of such a scheme, he has not to look far for Professors among some of the great writers of this day.

I must now bring this Note to a conclusion; for I have examined our Author's claims as an interpreter of Nature; an asserter of facts; a critic; a quoter of authorities; an *à priori* reasoner; a moralist; and a natural theologian; and on all these points he has been found wanting—partly from imperfect knowledge, partly from a deluding hypothesis, and most of all from a want of comprehending (as one of the best effects of a good training) what I have ventured to call the sanctity and severity of physical truth. As a book of science his Work is shallow, false in principle, and worthless; as a book of moral speculation it is intensely mischievous; and it is avowedly addressed, not to men of science, but to persons who have little power of analysing its sophistry, and little knowledge to instruct them how false the work is to the true teaching of Nature. As to its moral application, it not merely puts aside any belief in revealed truth: but it verges on material Pantheism. Such is my deliberate opinion of this *popular work*.

My sentiments on many grave questions, discussed in this Volume, appear, unfortunately, in a very disjointed and controversial form. There was no help for this; but I wish it had been otherwise. A writer who is opposed to us in principle naturally entrenches himself in the strongest positions he can find; and we are, on that account, exposed to some disadvantage while attacking him. Our arguments neither appear in their strongest array, nor in what we might think their natural order. It would, indeed, have been a far pleasanter and more fruitful task to have been sowing, and watering, and reaping, than to have been set down to the more servile work of plucking out weeds and rooting up thorns: but, unhappily, the pleasanter task has not fallen to my lot. I have, however, no misgivings as to the truth of my general argument; and it was my intention to offer, in this place, a summary, or skeleton, of the methods and principles by which the great leading truths of nature should be drawn out—not controversially, but dogmatically and positively: and then to point out, analogically, how they became connected with both moral and religious truth. A want both of time and space compels me to abandon this attempt; and here to end this long Note.

NOTE X.

Transactions of the Cambridge Philosophical Society.— "The Prelude" of W. Worsdworth, &c.

I INTENDED in this Note to have given an analysis of some of the papers in the *Transactions of the Cambridge Philosophical Society*, and a synopsis of the contents of the several Volumes. In papers that were above my reach the Authors would have assisted me, and I am confident that the synopsis would have been of great value: but I found, after a short trial, that, even in the most condensed form, an abstract and analysis of many ponderous Volumes could not be drawn out in less than two or three hundred pages. This part of my task is therefore reluctantly abandoned. But the publisher and the reader may, perhaps, rejoice at this. For the Volume is now swelled out of all common measure: and the Discourse, though none of the smallest, is so crushed between a monstrous Preface, and a ponderous, double-headed Appendix, that it begins to look like a grain of wheat between two mill-stones.

Trinity College, July 29, 1850.

P. S. I am tempted to make one digression more, in consequence of the publication of a great work not unconnected with the history of Cambridge, during the passage of these concluding sheets through the Press (*The Prelude*, by W. Wordsworth).

Some of the best poets of the last century exhibited in perfection the felicitous good sense of Horace—the poetry of society, taste, and manners; seasoned by tart satire, and (too often) tainted by sensuality. The followers in this school had a language that was polished and glittering, but conventional; and not stamped from the mint of nature. The soul of Wordsworth could not endure it, and from childhood he longed for something better. He was the child of Nature, and he grew up the poet of Nature: and he soon learnt to shew what inexhaustible stores of strength he could draw out of the old Teutonic elements of our tongue; and how it was possible to be great, eloquent, and imaginative, without borrowing a spangle from the fashionable conventionalisms of his day. But no man ever worked out a revolution without sometimes running into extremes: and while he cast away, in intellectual scorn, all meretricious decorations, he sometimes clothed his noble meaning in a bare, uncouth, prosaic garb, which most men thought but ill fitted for the adornment of his sentiments. But who, on the other hand, has spread before the wondering senses more glorious imagery, more true touches of Nature's painting, or loftier strains of poetical inspiration? He taught us a holier faith in Nature, and how to seek a better communion with her. He worked out, and not without many a hard-fought battle, and a long struggle against an adverse stream, a great revolution in the taste and poetical feeling of his countrymen; and he has opened a vast storehouse of enduring happiness to those who will take him for their guide, and will listen to his song.

But a man may dream away his life, while he pillows his soul in this kind of luxurious intellectual communion with the gorgeous forms of outer Nature, and be wanting even in catholicity of taste. For Wordsworth's poetry is not catholic, like that of Shakspeare. Nay, a student may feed on it and revel in it till he becomes an idolater of nature, to the verge of Pantheism ; so as to forget his fellow-men and his communion with them ; and duties higher still, and aspirations more lofty than can rise in the human breast by mere imaginative intercourse with the world of Nature ; whatever soul may be breathed into it by the heavings of a poet's heart, or whatever warmth may be given to it by the genial glow of his inspired love. Rousseau could sometimes call out the living soul of nature with all the power of Wordsworth ; but he was sensual and impure : and he could cover his impurity by words as glowing and as stirring, as those whereby he decorated the sentiments he had felt during his honest intercourse with Nature, and made other men feel with him. But Wordsworth was one of the purest of mankind.

We now know the growth of his early mind—told by himself poetically, but honestly, no one can doubt. He speaks not well of Cambridge ; but it is Cambridge as she was more than sixty years since ; and as she appeared to his youthful fancy and his ill-instructed reason. She was not then, nor is she now, any place of ideal perfection. I have myself felt some of the evils of which he sings : but this is no place for the discussion of them. He knew nothing then of human nature but what he had learnt in boyish solitude, while communing with himself among his native mountains. He was a raw youth with ample genius and a burning fancy ; and with schemes of perfectibility floating in his mind, which he learnt afterwards to look back upon as idle dreams, and sometimes would gently laugh at during his maturer life. In principle he was almost a Jacobin (a word not then invented) ; and, though moral from habit and temper, he was impatient both of political and intellectual control; and neither in those days (nor ever afterwards in advancing life) did he even attempt to drink freely at those fountains of material learning, which never ran dry after Bacon's days, and have gushed out with a continued living stream ever since Newton spent his philosophic life within our walls.

> "I, bred up 'mid Nature's luxuries,
> Was a spoilt child, and rambling like the wind,
> As I had done in daily intercourse
> With those crystalline rivers, solemn heights,
> And mountains, ranging like a fowl of the air,
> I was ill-tutored for captivity."
> (*The Prelude*, Book III.)

Such is his account of himself: and how could such a Youth be a wise judge of any great academic institution? And how could he tell us, except out of the visions of an untutored fancy, what it ought to be? It is arrant folly to quote his words as damnatory of the Cambridge system then; and still more to quote them as damnatory of the system now. That gross evils existed, I doubt not; for gross evils ran through all society. Young Wordsworth felt them, and described them well. But, within the last thirty years, he has many times lived among us as one of household: and no man ever poured out more heartfelt wishes for the stability of our ancient Colleges, or a firmer belief that in the form of discipline with which they have come down to us, they are working well for the character of Englishmen, and for the common good.

The reader will, I trust, pardon this (perhaps not ill-timed) digression: but one word more before I leave it. Wordsworth was not only pure from habit and self-control; but he was also pure from a principle above what he drew from his communion with Nature. He was a religious man: and many a time, when it has been my great happiness to roam with him over his native mountains, have I heard him pour out his thanks, that while he had been permitted to slake his innermost thirst at Nature's spring, he had been led to think of the God of Nature, and not to forget His redeeming love. Let, then, no academic student, while he honors the great Poet who is now gone, forget the Poet's faith; or dare to draw from his noble lessons the materials of an idolatrous or pantheistic dream, and then tell us that he is of the school of Wordsworth.

The last time I saw him, he was in deep domestic sorrow, and beginning to bend under the infirmities of old age. Whatever (he said) the world may think of me or of my poetry, is now of little consequence: but one thing *is* a comfort of my old age—that none of my works, written since the days of my early youth, contains a line I should wish to blot out, because it panders to the baser passions of our nature. This, said he, *is a comfort* to me. I can do no mischief by my works when I am gone: and sensuality is the great bane of all that is good and hopeful in our nature. Such were the Poet's words, in his old age and days of domestic sorrow; and I recommend them to the solemn thoughts of every Undergraduate who may read this page.

A friend has taken an objection to one or two expressions of the Preface, because (he tells me) they appear to lean towards a theory of development. It may be so, and I may have written incorrectly and incautiously; but I request any reader, who may be offended by my words, to remember in what sense I use the word "development," especially as it is explained above (*supra*, note to p. xlvi). It is possible that, from misunderstanding my words, some person might object to the last paragraph of p. cccvii. I do not there contend for a natural development of any higher types of manhood; nor did I mean to insinuate that man had sprung by natural means out of the lower animals. What I asserted was what I believed true—that Nature had been progressive: and this I urged as an analogical argument in favour of a belief that our future condition might be progressive: in other words, that, on analogical grounds, we might hope for a higher condition of existence, such as is revealed to us in the Word of God.

When the first part of the Preface was written (in 1847), I had the sixth edition of *The Vestiges* before me; and when the part was printed from the original MS. during the last autumn, I never thought of any later edition than the sixth. To bring my references into a perfect and literal accordance with the last edition, might perhaps make it necessary for me to cancel several pages. This volume is not my property, and the proprietors of it would have great reason to complain of me, if, after so very long a delay, I were to put them to any additional cost. My real dispute with the Author of *The Vestiges*, is not so much on minute facts, as on great principles: and it is impossible that he can so arrange the facts of Geology, by either modification or suppression, as thereby to make his principles either true or plausible.

I have been told that I have not done full justice to M. Plateau's very beautiful experiments in illustration of the Nebular hypothesis. It may be so; for though I read his Memoir soon after it came out, I never reperused it; and I never have had the pleasure of seeing his experiments repeated. What I contend for, is—that they merely illustrate La Place's dynamical reasoning. They add no new evidence in favour of the hypothesis; and they explain none of the difficulties, in the way of its reception, pointed out in the Appendix (No. I.).

It would have been better for me to have made no allusion to Mr. Kirkwood's analogy till I had seen his Memoir; and I have not yet been able to procure a copy of it: for I am now told that the analogy is not described correctly in a previous Note (No. VII. *supra*, p. 220), and that it ought to have been expressed as follows: viz. *The square of the number representing the times any Planet revolves round its axis during its period round the Sun varies as the cube of the diameter of the circle thus inclosing it.* If this be the asserted law, it is even more complicated and improbable than the law as stated above (p. 220); and all the other objections stand good against it. Even if it were true, we can only prove it in two cases out of seven. But we cannot prove it, except approximately, in any case; and it seems, instead of a planetary law, to be merely an accidental and approximate coincidence between two numbers. Let us again consider that the diameters of the several circles (as they are described above, p. 220), are constant; but, on the Nebular hypothesis, the time of a Planet's rotation about its axis is a constantly changing quantity during its consolidation. The Planets neither began their process of consolidation at the same moment of time, nor do we know the rate or law of their consolidation; and we are sure that they have not now the same density. We have, therefore, no reason to expect any fixed numerical law between elements that are invariable, and others that, apparently, are variable.

Another subject I may shortly allude to before I close this volume. A Royal Commission is soon to be sent down to Cambridge, and our Alma Mater is to be put upon her trial. She has, we believe, nothing to fear from any investigation, however searching, provided it be carried on in a wise, patriotic, and Christian spirit. Our institutions are historical, and by uniting and blending the present with the past, have had a very powerful, and we believe a very salutary, influence on the manners and tempers and principles of Englishmen. May Providence forbid that any rude hand should break these historical links, and, within our ancient walls, disconnect the present and the past! I would deprecate any great organic change, or any radical change in our principles of teaching, as pregnant with revolution, irreligion, and a decay of sound learning; and therefore a grievous loss to the manners and state of England: and I rejoice that my honest views were on record, while the University was doing her best to amend her Statutes, to improve her institutions, and to bring them into a better accordance with the wants of modern learning and science; and while she was little dreaming of any external power being brought to bear upon her, either to urge her on, or to constrain her, during her efforts to ensure the public good.

Time is a great innovator, and may have introduced the elements of decay amongst us. Some things may require renovation. Some restraints, not of our own imposing, may be taken from us, so as to give us a greater freedom, and a larger power of usefulness. Our economical and domestic administration have been, I believe, conducted on principles of honour and impartiality that cannot be assailed: but they may perhaps in some rare instances admit of modification and improvement. To discuss such questions here would be ill-timed and out of place.

I have no fear of an enlightened and patriotic Commission, composed of men who know our institutions well, who love them for what is good in them, and would not be willing to palliate or tolerate any lurking evil—of men who have the sentiments of Englishmen and the feelings of Christian gentlemen. But a Commission might be formed of men who would be harbingers of destruction, and would mercilessly scatter to the winds every thing that is good and great and salutary amongst us.

Ignorant and shallow men, who know nothing of us, and have no sympathy with our labours and no knowledge of our studies, have long been doing their very utmost to poison the public mind by crude, vulgar, and ignorant slanders directed against the old academic institutions of England. A Commission, acting temperately, fearlessly, and on a high principle, may perhaps do great good to us by putting a stop to such slanders—by telling the world that our University is governed on principles of honour and impartiality—that it has striven to do much good—and, within its principles and capacity, is willing to do more, if any better way can be pointed out to her. I repeat then, that as loyal subjects of our Queen, and affectionate sons of the University, we fear not any Commission such as the advisers of the Crown will recommend our Sovereign to send down to us.

When I wrote the words which begin this Supplement (*supra*, p. 177), I hoped that this Volume would be out of the Press before the expiration of the Term. But I began my task before I had strength for it; and I was soon compelled to suspend it for another month. Like many other tasks delayed beyond all reason, it is now completed in a hurry. The several sheets (and sometimes the separate pages) of this Supplement were sent one by one to Press as they were written; and I leave the University, for a time, committing the revision of my last sheets to the kind offices of a friend. I now conclude this Volume, recommending it with heartfelt good-will to the Undergraduates of Cambridge; and not without a hope that it may be the humble means of helping their studies, and contributing to their moral and intellectual health.

THE END.

SEP 27 1937